ECHNOLOGY DEPT.

Gas Journal

Vo. 265. 103rd Year. LONDON, JANUARY 17, 1951. No. 4572. Price 1/-

Registered as a Newspaper.

PUBLIC LIBRARY
FEB 2 1951
DETROIT

Every thoughtful housewife wants a

De La Rue

LARGE CAPACITY

GAS COOKER

THOMAS DE LA RUE & CO. LTD. (Potterton Gas Division) Imperial House, 84-86 Regent St., London, W.1

Northern Area: 4, Albert Square, Manchester, 2

Midlands Area: Portobello Works, Warwick

SUBME

The John Thompson submerged type Ash Conveyor is the simplest and most effective means of ash removal, since it has only a single moving element—the belt itself, a slow-speed troughed rubber belt submerged in water.

The water-trough quenches the ash, minimises abrasion, and reduces friction to a small figure. Power consumption is very low, since the weight of the ash is largely water-borne. This type of conveyor is dustless, noiseless and has virtually negligible maintenance and renewal costs. It can be fitted to any kind of boiler plant and needs no excavating.

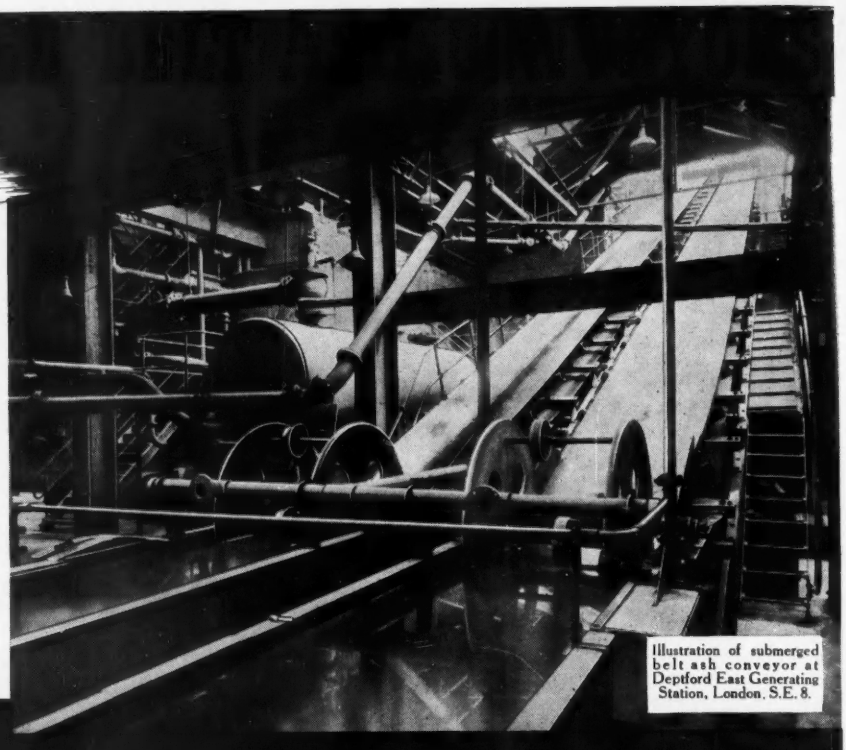


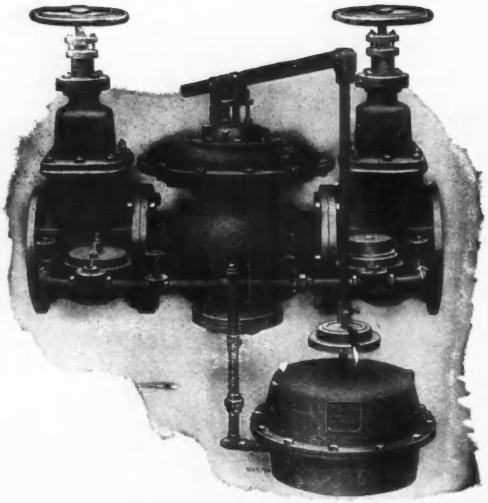
Illustration of submerged belt ash conveyor at Deptford East Generating Station, London, S.E. 8.

THE JOHN THOMPSON

C.7

DISTRICT GAS GOVERNORS

For High Pressure Gas Distribution



These Governors reduce the pressure of the Gas (up to 50 lbs. per square inch) at the inlet down to the ordinary district pressure.

The pressure is maintained constant whatever the variation in the demand for gas and in the pressure on the inlet side.

Absolute certainty of action under all conditions.

A gas undertaking in the South of England has over 80 of these Governors in use.

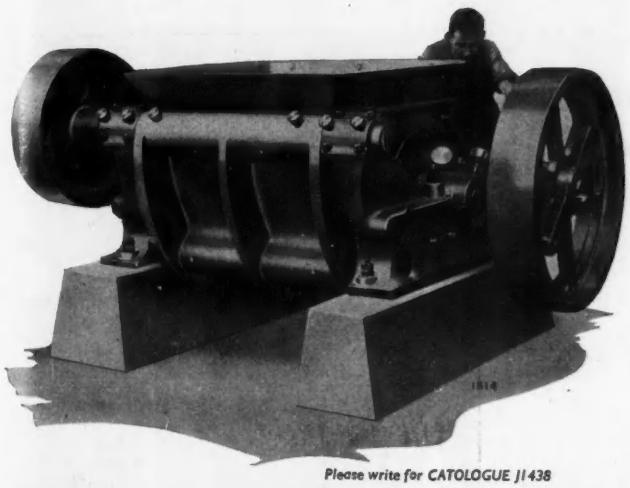
GOVERNORS SUPPLIED TO SUIT EVERY POSSIBLE CONDITION

THE BRYAN DONKIN CO. LTD., CHESTERFIELD

BJD

SINGLE ROLL BREAKERS

FOR COAL, COKE, AND SPENT OXIDE



- PATENTED OSCILLATING BREAKER PLATE INCREASES CAPACITY 20%
- LARGE FEED SIZES
- NON-CHOKING
- MINIMUM OF FINES

Please write for CATOLOGUE J1438

BRITISH JEFFREY-DIAMOND LTD. WAKEFIELD

GEORGE GLOVER

& Co. Ltd

DOMESTIC METERS

GAS METERS

Product of Radiation Ltd. Dependable year-in year-out

122, KINGS RD. CHELSEA LONDON S.W.3

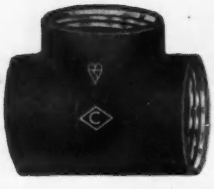
Branch works

WARRINGTON · LEEDS · MANCHESTER · CARDIFF

FROM THE RAW MATERIAL TO THE FINISHED ARTICLE

PIPE FITTINGS

Crane pipeline equipment, which is made to British standards and has many exclusive features, includes pipe fittings of every type and size — Cast Iron Flanged and Malleable Iron Screwed Fittings (banded or plain). The strictest control is exercised throughout every production stage from laboratory testing of raw materials to the final finishing operations and tests for strength and flawlessness.



TAPER THREADS

To ensure stronger and more reliable joints Crane Malleable Iron Fittings have taper threads, which engage the pipe in a full metal-to-metal joint.

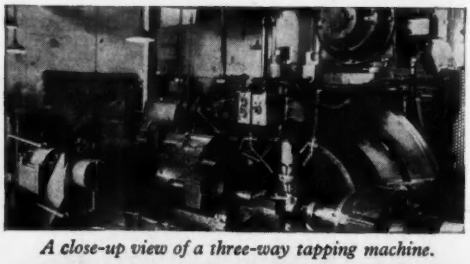
OTHER PIPELINE FITTINGS Valves of every type for water, steam, oil and air; unions, expansion joints, flanges; pipe hangers and brackets; steam traps, fabricated pipework, cocks, gun metal screwed fittings etc.

CRANE

FITTINGS FOR ANY PIPELINE

Part of the Crane Malleable Iron Foundry.

General view of the Crane Malleable Iron Machine Shop.



A close-up view of a three-way tapping machine.

Each individual fitting is tested for soundness.

CRANE LTD., 45-51 LEMAN STREET, LONDON, E.1. Works : IPSWICH

BRANCHES : BIRMINGHAM, BRENTFORD, BRISTOL, GLASGOW AND MANCHESTER

PREPAYMENT *Meters*

Since David Grant & Co. Ltd., introduced one of the first pre-payment meters early in their career, their record has been one of steady progress. In 1895 David Grant were already offering pre-payment meters with Optional Coin facilities. Today, with their wide range of pre-payment and ordinary meters, gauges and pumps, they still maintain that progressive policy which has made their name synonymous with service and satisfaction

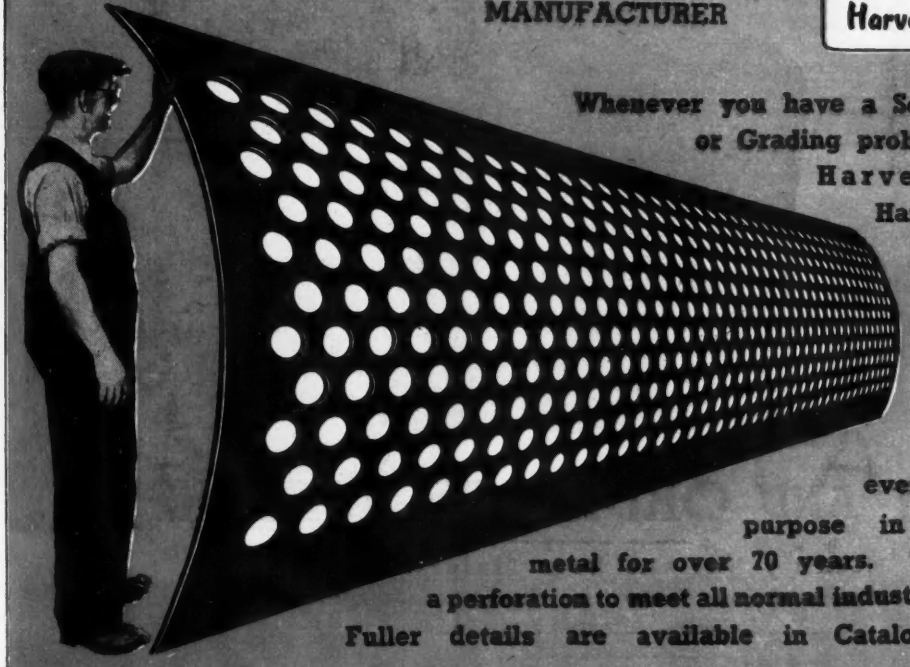
David Grant
100 cu. ft.
Optional Coin Meter

DAVID GRANT & CO 1855 PIONEERS IN PREPAYMENT METERS 1950 EDINBURGH

DAVID GRANT & CO., LTD., PHONE EDINBURGH 41574
EAST CROSSCAUSEWAY, EDINBURGH, 8.

TO THE GAS PLANT MANUFACTURER

Yours the problem-
Harveys the answer!



Whenever you have a Screening, Sorting or Grading problem — remember Harveys. Because Harveys have been making 'Harco' perforated metal screens for every conceivable purpose in every kind of metal for over 70 years. There is available a perforation to meet all normal industrial requirements. Fuller details are available in Catalogue G.J. 782.

G. A. Harvey & Co. (London) Ltd. Woolwich Road. London. S.E.7

C4

CARRON GAS-HEATED PASTRY OVEN

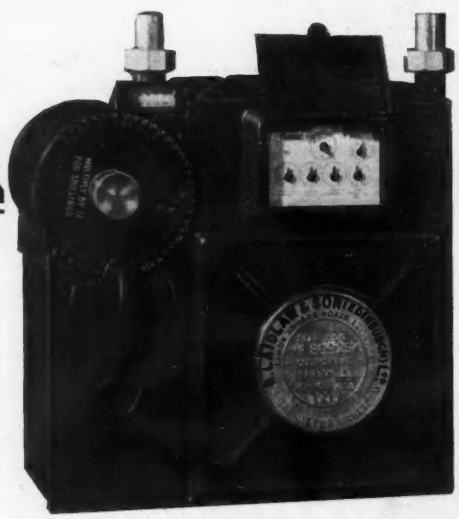
Interior of cast-iron and sheet-steel; exterior vitreous enamelled • Drop doors, fitted with heat-resisting packing, form airtight joint against front • Insulated oven door handles • Pilot jet fitted to each burner • Packed throughout with thermal insulation. Write for full details and prices.

CARRON

This is a Carron product made by modern Carron processes embodying the Carron tradition for fine workmanship begun in 1759

CARRON COMPANY · CARRON · STIRLINGSHIRE: 15 *Upper Thames St., London, E.C.4* · 22-26 *Redcross St., Liverpool, 1* • 125 *Buchanan Street, Glasgow, C.1* · 14 *Ridgefield, Manchester, 2*

Esto Perpetua



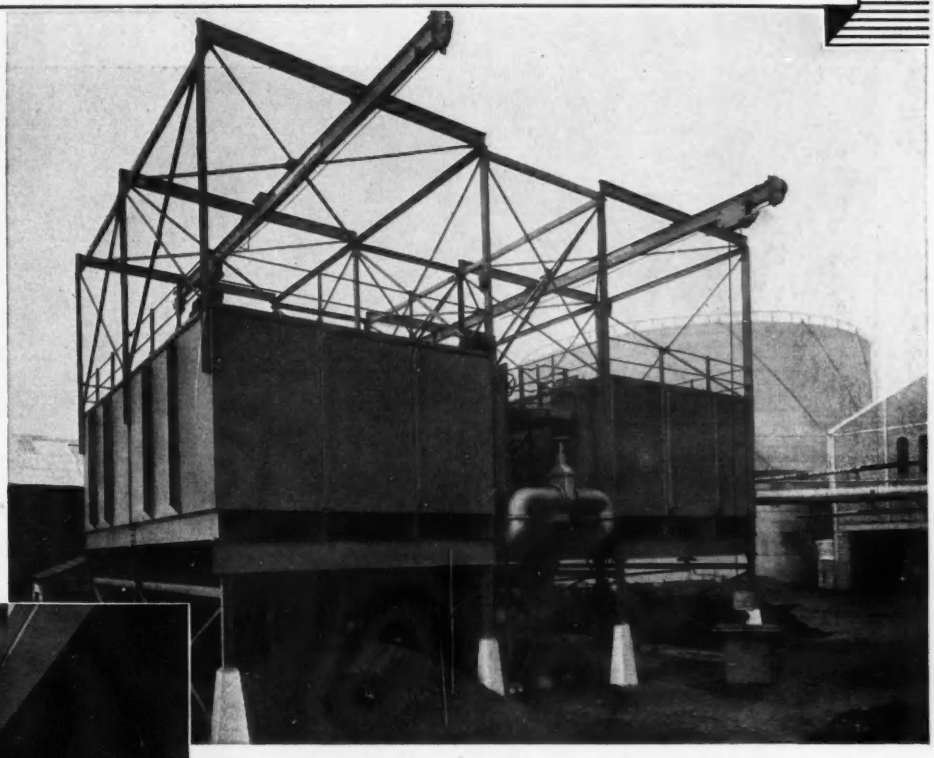
I.G.E. AND HIGH CAPACITY

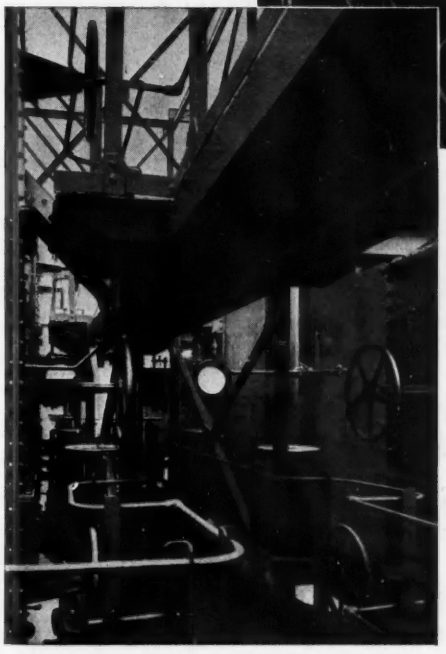
SLOT AND ORDINARY METERS

Nothing But the Best Materials and Workmanship Used in Their Manufacture
Repairs—Parts Supplied

R. LAIDLAW & SON (Edin.) Ltd., SIMON SQUARE WORKS, EDINBURGH
8/9, LUDGATE SQUARE, LONDON, E.C.4

Whessoe Purifiers





The illustrations show a 4-box set of Whessoe purifiers, each 18 ft. x 18 ft. x 10 ft., with a capacity of 1½ million cu. ft. per day, for the Ormskirk Undertaking of the N.W. Gas Board.

This is a simple installation with modern features—deep, welded mild-steel, overground boxes, with divided and reversible gas flow. Simple and efficient charging is provided by Morris 3-ton skips, operated by pulley-blocks, with hoisting and traversing controlled by an electrically driven winch, which is also arranged to provide for cover-lifting.

WHESSOE LIMITED DARLINGTON

LONDON - 25 VICTORIA ST. S.W.1

Telephone: Abbey 3881 Telephone: Darlington 5315

A BIG ADVANCE IN PROTECTIVE PAINTING by Foochow

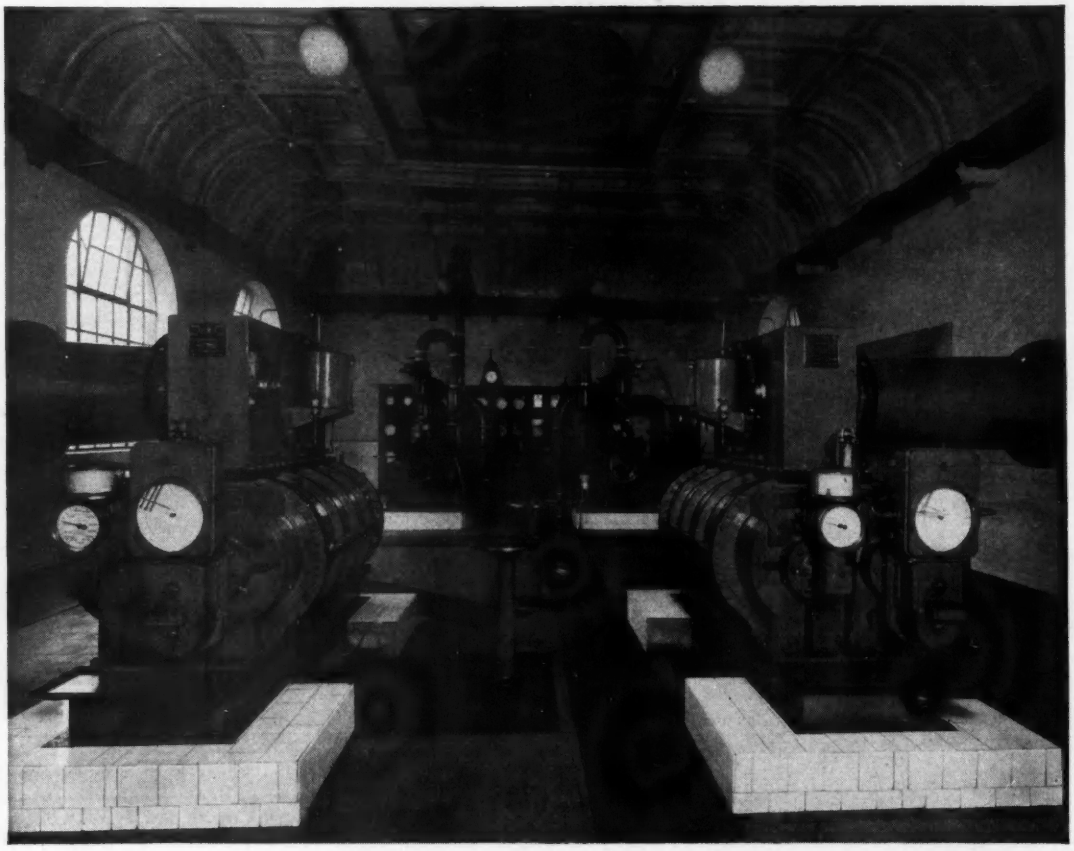


Illustration shows one of the largest Exhauster and Compressor Houses in the North of England—decorated throughout in FOO-3-4

Foo-3-4 Super Synthetic Enamel

for **WALLS, CEILINGS, ENGINES, COMPRESSORS, CANTEENS, WASH-HOUSES, ETC.**

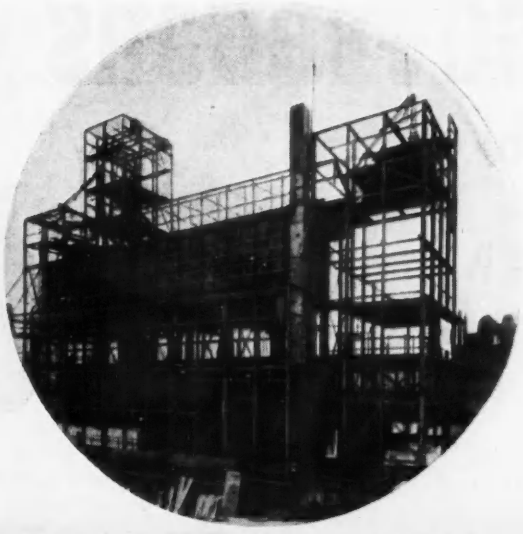
- DRY IN 4 HOURS. So quickly does the paint film set, that in normal atmospheric temperatures, two coats can be applied in one day.
- DRIES TO A HARD "PORCELAIN" SURFACE much quicker than ordinary enamels and paints, consequently nullifying the risks of absorbing dust, grit and grime.
- MAR-PROOF AND EASILY CLEANED. The pot hard, tough film provides greater resistance to disfigurement and can be repeatedly wiped down without detriment.
- A FUME AND MOISTURE RESISTANT which is practically unaffected by extreme conditions, providing remarkable protection even on external work.

THE NEW SUPER SYNTHETIC ENAMEL THAT IS HEAT, STEAM, OIL AND GREASE RESISTING

DONALD MACPHERSON & CO., LTD., ALBION ST., MANCHESTER and MITCHAM, LONDON

Branches at Birmingham, Belfast and Glasgow

February 1950...



Progress on the new Intermittent Vertical Chamber Oven Installation at Scarborough.

October 1950...

Gas making commenced at the Scarborough plant in November 1950!

The installation consists of twenty-five 3.75 ton chambers arranged in five settings of five chambers each, with a nominal output of 2½ million cubic feet per day. Complete coal and coke handling plant is incorporated.

ENGINEERS TO THE FUEL INDUSTRIES

W. J. JENKINS & CO. LTD., RETFORD, NOTTS
Phone: RETFORD 131
London Office: 28 Victoria St., S.W.1 Phone ABBEY 1778

by Jenkins* RETFORD of course

GOVERNORS
for the GAS INDUSTRY

by

JEAVONS

JEAVONS ENGINEERING COMPANY
(Proprietors: E. E. JEAVONS & CO. LTD.) TIPTON · STAFFS · ENGLAND

'Phone :— Tipton 2161 (5 lines) ' Grams :— "PIPELINES, TIPTON"

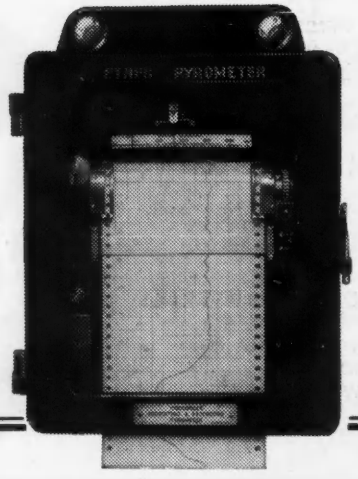
Ether-Wheelco "Capacitrol" E.W.221.

This instrument utilises electronic action to achieve rapid and accurate control of furnace temperature. Supplied for On, Off, High, Low and Proportional Control.

Ether "Indicorder" Type C.R.M.S.

Indicate, Record and Control Gas Furnace Temperatures automatically. Made for Wall or Panel Mounting. Send for List No. 645.

ETHER
AUTOMATIC
TEMPERATURE CONTROLLERS
Mechanically and Electronically Operated



Pass your automatic temperature problems to us — We design and manufacture a full range of instruments and Valves and can advise the most suitable apparatus to meet your requirements.

We also manufacture, under the American Wheelco Co. Patents, a range of Ether-Wheelco Electronic Controls which, when supplemented by our normal Ether range of Instruments, cover every Automatic Temperature Control requirement.

Our technical advisory service is always at your service.

ETHER LIMITED
TYBURN ROAD, ERDINGTON
BIRMINGHAM, 24.
Telephone - - . EASt 0276-0277

THE POST-WAR COOKERY BOOK

every woman is waiting for

WOMEN everywhere have been enchanted by this unusual cookery book. In fact, the first edition has been sold out completely in five months. Specially compiled by a domestic-science expert, this beautifully illustrated book is ever useful in solving the modern woman's catering problems. Here are recipes for every requirement — the simple family supper, the birthday tea, the cocktail party, special dishes for children and invalids. Planned essentially for family cooking, this book with its tabulated charts, detailed sketches and comprehensive instructions will be equally welcomed by the young bride and the experienced housewife.

SECOND PRINTING

READY NOW

★

this fascinating cookery book contains

451 RECIPES

6 FULL-PAGE COLOUR PHOTOGRAPHS

106 PAGES

10 TABLES

24 BLACK & WHITE PHOTOGRAPHS

12 DIAGRAMS

Order your copies now from

GENERAL GAS APPLIANCES LIMITED
Corporation Road, Audenshaw, Manchester

Price to Gas Undertakings 6/- Retail Price 7/6

Proprietors: Allied Ironfounders Ltd. TRADE MARK

PROTECTION

IN Chemical Works, Gas Works, Refrigerating plants, etc., the necessity for dealing with gas escapes and repair work calls for efficient protection of the men on the job. This is provided, in low concentrations of gas, by the "PURETHA" Respirator, which is comfortable, efficient and simple. Its canisters are coloured according to the gas or group of gases against which they give protection. Full mask and mouthpiece, nose-clip and goggles types.

For protection in confined spaces and high concentrations of gas, the company's well-known types of oxygen and compressed air self contained Breathing Apparatus are available. All other protective devices for the worker are also manufactured and supplied: Smoke helmets, short distance fresh air apparatus, resuscitating apparatus, dust masks, protective clothing, goggles, etc.

DIVING APPARATUS, BREATHING APPARATUS OF ALL TYPES, RESUSCITATING APPARATUS AND ALL INDUSTRIAL SAFETY APPLIANCES

Telephone: Elmbridge 5900

SIEBE, GORMAN & CO. LTD. LONDON

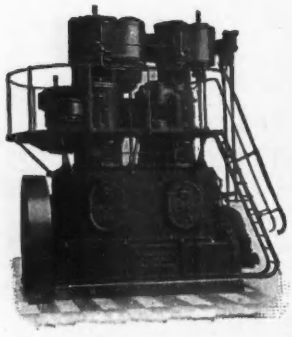
EVERYTHING FOR SAFETY EVERYWHERE

Telegrams: Siebe, Surbiton

TOLWORTH, SURBITON, SURREY

COMPRESSORS
& DRY VACUUM PUMPS FOR AIR OR GAS.

* * *



These double-acting cross-head type Compressors are provided with forced lubrication. They may be driven by any suitable power unit, as shown below, or by steam cylinders in tandem with the compressor cylinders making a self-contained unit, as shown on the left.

Single Stage. Pressures up to 40 lbs. per sq. in. Capacities up to 10,000 cu. ft. per min.

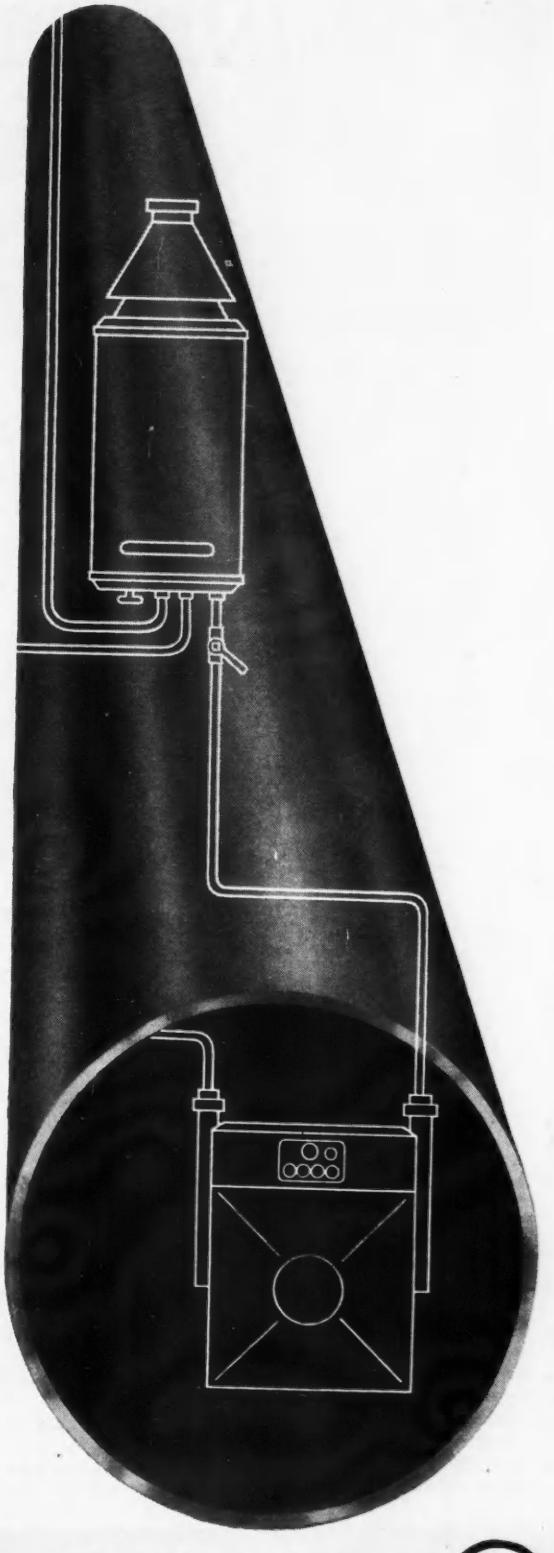
Two Stage. Pressures up to 120 lbs. per sq. in. Capacities up to 5,000 cu. ft. per min.

For particulars of these machines and for other types write (mentioning this journal) to:—

REAVELL & Co., LTD.,
Ranelagh Works, Ipswich.

Telegrams: "Reavell, Ipswich." Telephone Nos. 2124 & 2125 Ipswich.

I.C.I. Copper tubes ensure trouble-free Gas Systems



For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

1 **Economical, both in laying costs and maintenance.**

2 **Not attacked by normal town gas.**

3 **Easily manipulated and installed.**

4 **Strong in relation to their light weight.**

5 **Neat in appearance.**

Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.

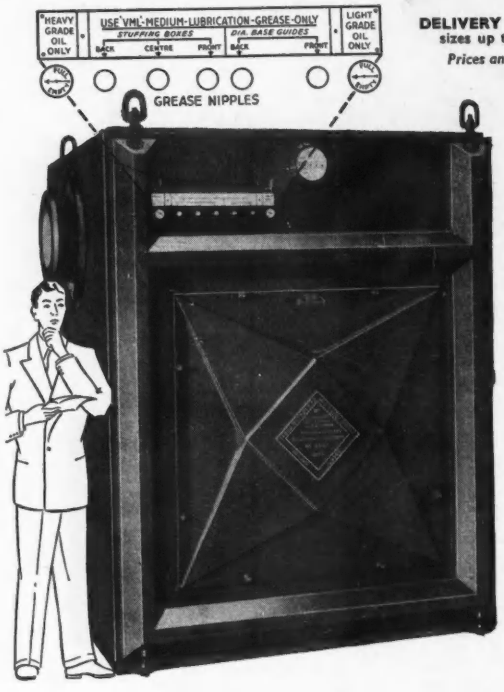
IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SW1

Fittings for copper tubes are made by Fyffe & Co. Ltd., Dundee, a subsidiary company of I.C.I. Ltd.

M.18

M-P INDUSTRIAL METERS

(SMALL CASE)



DELIVERY : Early delivery of all sizes up to 9,000 cu. ft. per hour.

Prices and technical details on application.

Vanda Meters Ltd. claim to be pioneers in the development and production of Small Case Industrial Meters, permitting, with safety, the long overdue reduction in case sizes for standard capacities.

In 1942, using "M.P." Patented Multiported Valves and Valve Gear, we converted an old 300 lt. case (nominal throughput 1,800 c.f. per hour), to a throughput of 25,000 c.f. per hour. This meter was duly stamped, and had an absorption figure of $\frac{5}{10}$" W.G. taken in situ, working at near full capacity. This meter has worked satisfactorily under daily load to date.

Vanda Meters Ltd. build "M.P." High Efficiency Gas Meters in a range covering from 450 c.f. to 30,000 c.f. per hour.

Industrial Engineers, Please Note!

The "M.P." Meter is used by a large number of Undertakings with major Industrial loads, and is giving general satisfaction.

High Gas throughput means large port area valves.

"M.P." Multiported Valves permit of short valve travel in terms of linear feet.

Data.	
Overall Height	87".
Width over flanges	76".
Depth back-front	64"
Height to Flange Centres	69"
Flange size 10". B.S.T.	Table "A"
Capacity per Revn.	100 c. ft.
Capacity of meter	30,000 cu. ft. per hour.

All bearing surfaces are lubricated.

VANDA METERS Ltd.

NEW VANDA WORKS NELSON Lancs.

Telephone: Nelson 178

AH— TISHOO!

Coughs and colds spread like wildfire and are a serious cause of ABSENTEEISM.

We can help you to combat and confine infection with our preparations, some of which are listed below.

Send for particulars and prices.

★ SYRUP PINI. CO. CUM KREOSOTE. This is very palatable, has a powerful antiseptic effect against the persistent cough and diminishes the risk of infection spreading.

★ "QUINCABEL" FOR COLDS. Assists in arresting the development of a cold or in its dispersement.

★ "G.P." GERMICIDE AND ANTISEPTIC. An essential as a general infection combatant.

★ "AMARATONE" TONIC. A first-class tonic when vitality is low, for building up resistance to infection.

★ A.P.C. TABLETS. (Aspirin, Phenacetin, Caffein). A splendid prophylactic in cases of pains and colds.

★ "SANOID" ANTISEPTIC SPRAYING SOLUTION. A pleasant and effective anti-infection spraying solution.

★ IODISED THROAT TABLETS. An effective means of disinfecting the mouth and throat and reducing infection spreading.

CUXSON, GERRARD & CO. LTD.

SPECIALISTS IN FIRST AID

OLDBURY, BIRMINGHAM Phone Broadwell 1355

RASCHIG RINGS AND BERL SADDLES *for* TOWER PACKING

●

Made of a Semi-Porcelain Body. These Rings and Saddles are all made of non-absorbent material, thus allowing them to be washed and used again.

●

J. GIMSON & CO. (1919) LTD.,

Market Street, FENTON, STOKE - ON - TRENT.

Telephone: Stoke-on-Trent 4181.

Peebles

& CO. LTD.

FIGURE NINETYEIGHT

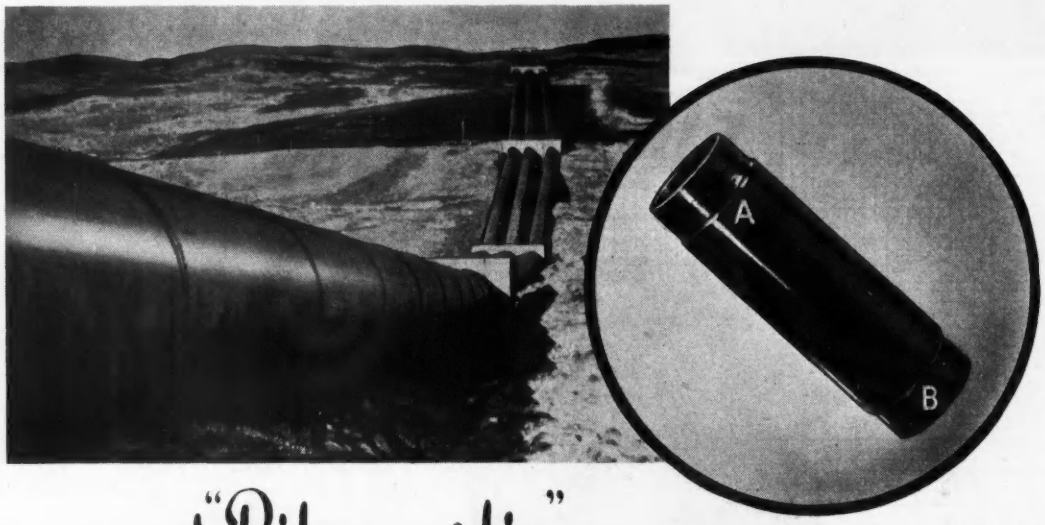
A *Scientifically* designed GAS GOVERNOR that gives *Results.*

Write for Technical data to :-

PEEBLES & CO. LTD., Tay Works, West Bowling Green Street, Bonnington, Edinburgh

Grams—TANGENT, EDINBURGH. *Phone*—LEITH 36544 & 35069

12 Essential requirements for an efficient Pipe Coating....



.... and "Bitumastic" has them all

This photograph shows a piece of 1½ inch steel pipe coated with (A) "Bitumastic" Enamel over a priming coat of (B) "Bitumastic" Solution. The enamel has been removed at each end to show the substantial thickness of the coating.

The replacement of underground pipes is a slow and costly business. The wise engineer knows that reliable protection can only be obtained from material which has been designed to meet **all** normal eventualities. "Bitumastic" 70b Enamel is not just a general anti-corrosive. It has been specifically designed for application to gas, water and oil pipelines. Its special features can be summed up as follows :—

(1) Permanently waterproof.
(2) Chemically inert.
(3) Possesses strong adhesion.
(4) Permanently staple in composition.
(5) Not affected by surrounding soil.
(6) Withstands variations of underground temperature.
(7) A non-conductor of electricity.
(8) Forms a tough coating averaging $\frac{1}{8}$ of an inch thick.
(9) Is capable of practical and rapid application in the field and sets instantly. Pipes can be immediately lowered into trench and back-filled.
(10) Resilient to ordinary handling.
(11) Although it is sufficient in itself, it is reinforced by and lends itself to any form of wrapping.
(12) The combined cost of the material and application represents but a small percentage of the cost of the entire line.

REMEMBER — NEXT TIME SPECIFY "BITUMASTIC"

"BITUMASTIC" REGISTERED TRADE MARK 70B ENAMEL

Send to-day for full particulars.

AGENTS THROUGHOUT THE WORLD

WAILES DOVE BITUMASTIC LTD • HEBBURN • Co. DURHAM

H49

SERVICE

FOR THE GAS INDUSTRY

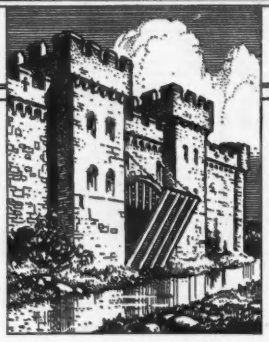
HARDMAN & HOLDEN LIMITED

INCORPORATING MANCHESTER OXIDE CO LTD

MANOX HOUSE · MILES PLATTING · MANCHESTER · 10

TELEPHONES: COLLYHURST 1551 (11 LINES) • TELEGRAMS: OXIDE MANCHESTER

Φ12



PROTECTION

GAUNTLET

GAUNTLET

WEATHER TESTED PAINTS

ARCHD H. HAMILTON & CO. LTD

27-37 BARDOWIE STREET POSSILPARK GLASGOW.N

A GREAT SUCCESS IN

Small kitchens and flats

The

Dainty

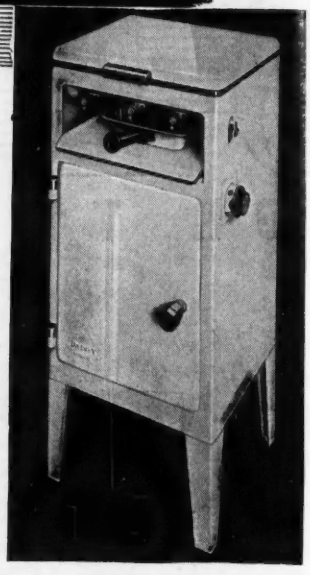
MINOR

This efficient little cooker of large capacity is made especially for small kitchens and flats.

Its cast iron construction ensures durability and low maintenance cost.

For hire purchase or for simple hire the Dainty Minor is ideal.

Approved and adopted by leading gas boards.



R. RUSSELL & SONS LTD., DERBY

Agents for Scotland and Northern Ireland

JAMES R. THOMSON & CO., LTD., 10, Blythswood Street, Glasgow, C2

TUBELA Hydraulic Pipe Bending Machines

Following the success of our copper tube] bending machines our range of Hydraulic Pipe Benders has been produced to deal with all classes of heavy water, gas or steam barrel from ½" - 3" diameter. *(Model H.1 illustrated).* A special feature is our patented attachment enabling 180° bends to be effected rapidly and with ease. Model H.2 TUBELA Hydraulic Bender, the latest in our range is designed to bend heavy gauge pipes from ½" - 1¼" only and is very competitive in price. These machines are modern in every sense of the word.

Model H.1
Hydraulic Bender

Please write for full details

LAWLER, AYERS & CO. LTD.

54 OLD BROAD STREET, LONDON, E.C.2

Tel. LONDON WALL 5101 (3 lines)

IN WIDE OPEN SPACES

OR CRAMPED LITTLE PLACES

HILMOR BENDS

with equal ease

- Lightweight bench model and portable benders for the plumber.
- Rotary hydraulic benders for gas and steam tube.
- Hand and power-operated general purpose and short radius mandrel benders.

HILMOR LTD.

(SALES AND SERVICE)

65, CALSHOT STREET, LONDON, N.1.

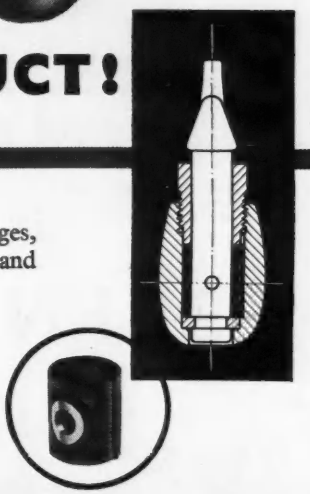
Telephone : TERminus 4714.

Telegrams :

"Tubenders" Phone London.

A NEW *Klinger*

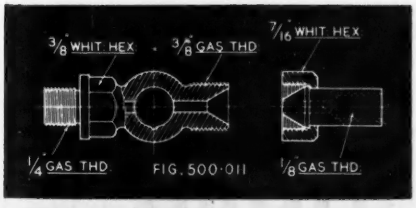
"SLEEVE-PACKED" PRODUCT!

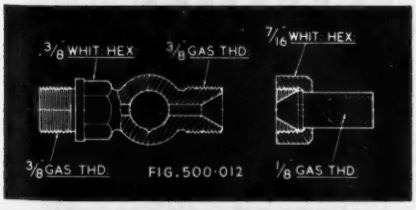


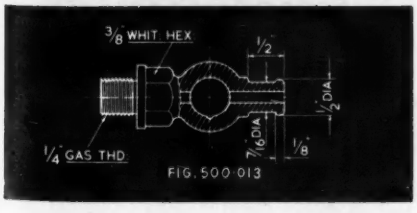
The AB. 10 Cock to replace small Taper Plug Cocks for Pressure Gauges, Air Reliefs, Drains, Instrument Connections, Compressed Air, Gas and Hydraulic Controls and similar equipment.

Machined from brass and polished all over, this is a simplified design, with the minimum of components, based on our world renowned " Sleeve-Packed " principle.

Tested hydraulically to 1,000 p.s.i., it will give reliable service and easy maintenance with long life under the most exacting conditions. Offered at prices comparable to ordinary unpacked fittings.







AVAILABLE IN SIX DIFFERENT PATTERNS

Cock Bore ¼". With male and female screwed connections, with or without union ends.

FIG. 500·011 *Screwed ¼" B.S.P. Male with ⅜" Union Connection on the other end.*

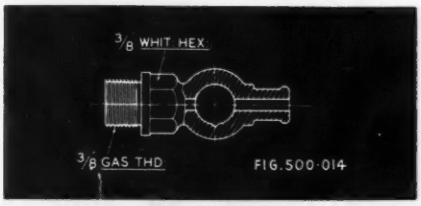
FIG. 500·012 *Screwed ⅜" B.S.P. Male with ⅜" Union Connection on the other end.*

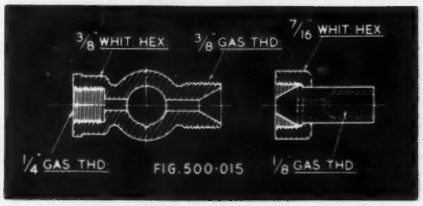
FIG. 500·013 *Screwed ¼" B.S.P. Male with plain Nipple at other end. (Suitable for discharge to atmosphere or small hose connection.)*

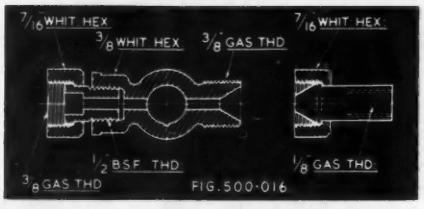
FIG. 500·014 *Screwed ⅜" B.S.P. Male with Nipple at other end. (Suitable for discharge to atmosphere or small hose connection.)*

FIG. 500·015 *Screwed ¼" B.S.P. Female with ⅜" Union Connection on other end. (Suitable for Pressure Gauges.)*

FIG. 500·016 *Screwed ⅜" B.S.P. Female (loose nut connection) with ⅜" Union Connection. (Suitable for Pressure Gauges.)*







Write for illustrated information folder with prices and details.

RICHARD KLINGER LIMITED

KLINGERIT WORKS, SIDCUP, KENT. **Tel: FOOtscray 3022**

B

"I WISH I HAD KNOWN BEFORE"

It only goes to show that until one has thoroughly examined samples it is impossible to determine when one is getting the Best.

MESSENGERS'

Hot Brass Pressings

IN

CONTINUOUS PRODUCTION

FOR GAS INDUSTRIES

Send us your enquiries, Sketches, Blue Prints or Samples NOW. We shall be pleased to submit prices that will interest you.

MESSENGER & SONS
(BIRMINGHAM) LIMITED
PERCY ROAD, GREET,
BIRMINGHAM, 11
TELEPHONE: VICTORIA 1071/2
TELEGRAMS: MESSENGERS, BIRMINGHAM

SPECIALISTS in ERECTION, DISMANTLING, ETC., GAS PLANT, GASHOLDERS, PURIFIERS, FACTORY BUILDINGS, SHEETING, GLAZING.

W.D. (SHEETERS) LTD.
BARCLAYS BANK CHAMBERS, OWEN STREET, TIPTON,
Telephone: TIPTON 1958. STAFFS.

CASES FOR BINDING
Quarterly Volumes of the "Gas Journal."
5/- each, post free
Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

Foliac
GRAPHITE PRODUCTS LTD.
LONDON, S.W.11.

INSTRUMENTS
by
Bristol's
OF WEYMOUTH
can give you
MORE CONSISTENT QUALITY
FEWER REJECTS
EXACT REPRODUCEABILITY
AND LOWER COSTS

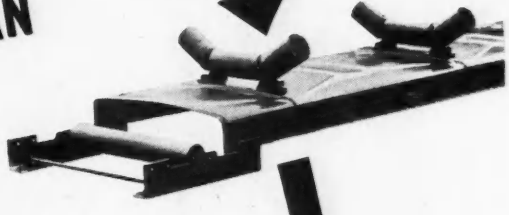
by automatically recording and controlling Temperature, Pressure, Flow, Specific Gravity or any other physical factors which are important in your process.

BRISTOL'S INSTRUMENT CO., LTD
15 LYNCH LANE · WEYMOUTH · DORSET
Telephone: 2140

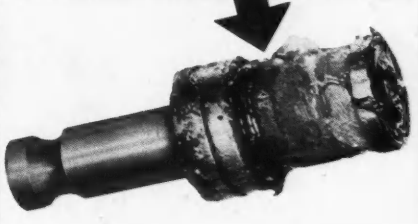
18899B

CONVEYORS!

YOU CAN'T DO BETTER THAN FIT M&C IDLER ROLLERS



Most of the well-known conveyor makers buy their idler rollers from M&C. They value the supremely easy running, and the way the efficiency continues high. They know that friction-free labyrinth seals keep the ball bearings clean, and proof against attack even by penetrating dust. They have found the idlers have a long life — sometimes twenty years — preserve the belts, and reduce conveying costs. These conveyor specialists show by their example that it pays to use M&C idlers. *Booklet E.59 is yours for the asking.*



For permanent or temporary conveyors, in gantries, out of doors or inside factories, M&C sectional belt conveyors simplify maintenance. The spindle, shown withdrawn from its idler roller after long service, still has plenty of soft clean grease around the bearings.

MAVOR & COULSON LTD

BRIDGETON, GLASGOW, S.E. OLIVE GROVE ROAD, SHEFFIELD, 2 36 VICTORIA STREET, LONDON, S.W.1

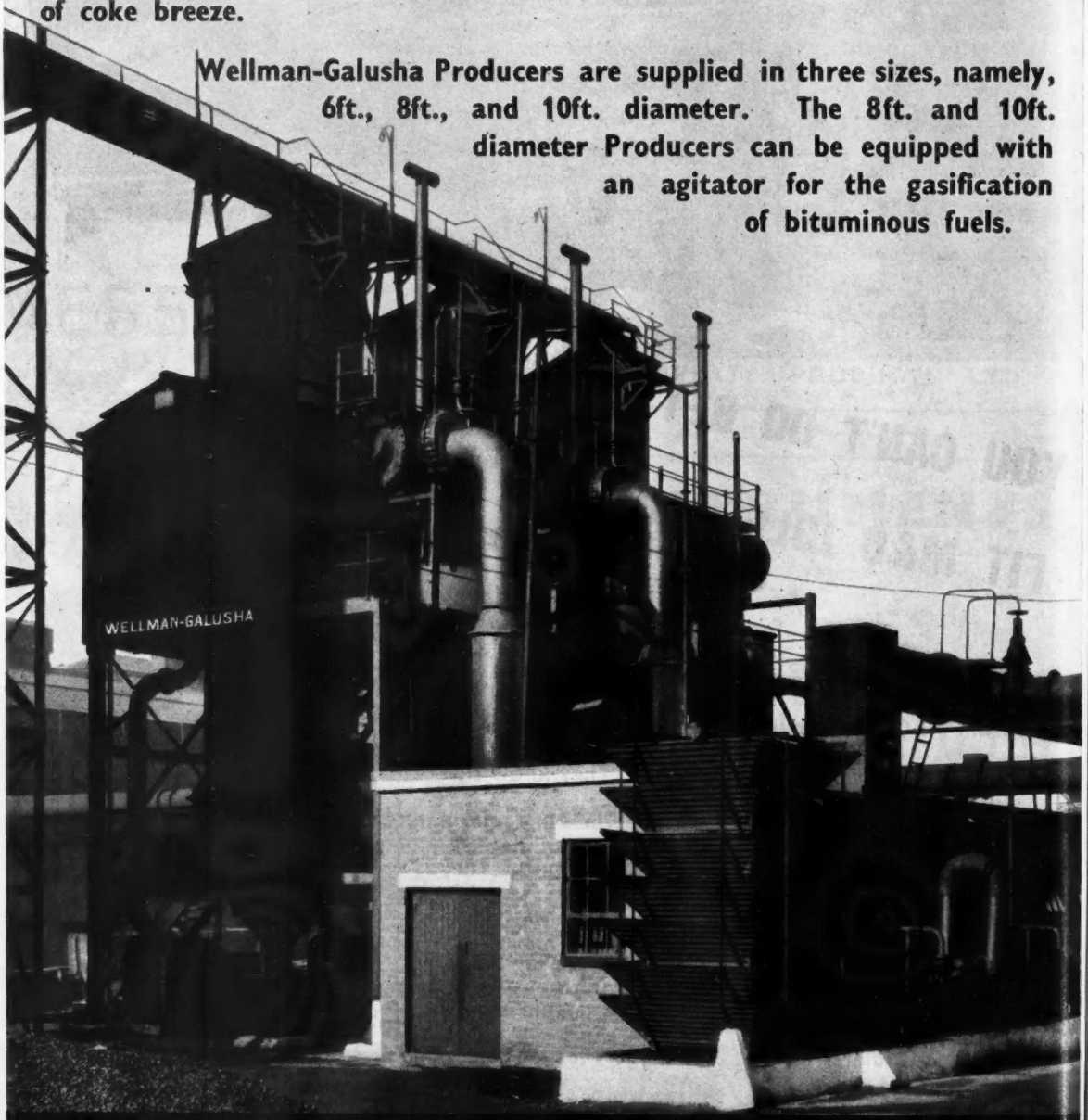
Wellman-Galusha Gas Producers

generate

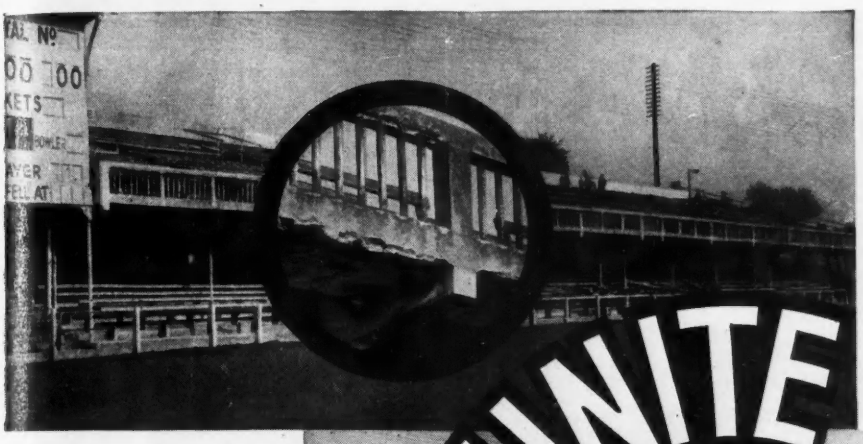
High Quality Gas from Low Grade Fuels

A battery of three 8ft. diameter Wellman-Galusha Gas Producers, equipped with fuel storage bins and Gas Cleaning Plant, for the efficient gasification of coke breeze.

Wellman-Galusha Producers are supplied in three sizes, namely, 6ft., 8ft., and 10ft. diameter. The 8ft. and 10ft. diameter Producers can be equipped with an agitator for the gasification of bituminous fuels.



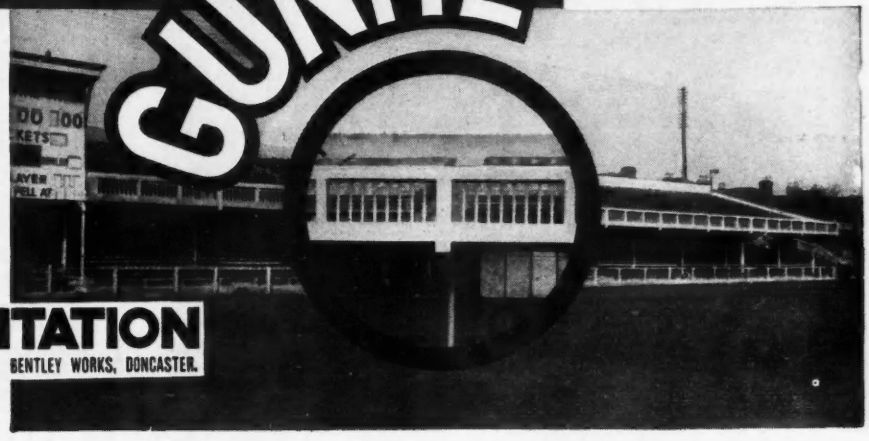
THE WELLMAN SMITH OWEN ENGINEERING CORPN. LTD.
PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1 WORKS: DARLASTON, SOUTH STAFFS.



GUNITE REPAIRS to the Grandstand at 'Trent Bridge.' Before and after treatment.

Estimates given for encasing structural steelwork and covering the wearing surface of chutes and bunkers.

GUNITE



Photographs by kind permission of the Nottinghamshire County Cricket Club, and Messrs. Sutton & Pearce, Chartered Architects and Surveyors 15, Clarendon Street, Nottingham.

THE CEMENTATION CO. LTD.
BENTLEY WORKS, DONCASTER.

London Office:
39, VICTORIA STREET, S.W.1.
Tel.: Abbey 5726-7-8

ALEXANDER WRIGHT & CO LTD

1, Westminster Palace Gardens, WESTMINSTER, S.W.1

INSTRUMENTS for Works and Laboratory.

CALORIMETERS:

Boys'; Simmance Calorgraph; "P.R." Recorder; Indicating; Portable.
For low and high C.V.

UNDERPRESSURE ENGINEERING CO., LTD.

UNDERPRESSURE CONNECTIONS
SPLIT COLLARS
SOCKET CLIPS

UNION FOUNDRY, MANSFIELD, NOTTS.
ALL TYPES OF DISTRIBUTION MATERIAL IN STOCK
Service Enquiries:
STAFFORD HOUSE, NORFOLK STREET, STRAND, W.C.2.
'Phone: MANSFIELD 1256. *'Grams:* CASTINGS, MANSFIELD.
'Phone: TEMPLE BAR 9910. *'Grams:* WASHER, ESTRAND, LONDON.

CENTRAL ACTION DRILL STANDS
SERVICE CLEANSERS
TOOLS, ETC.

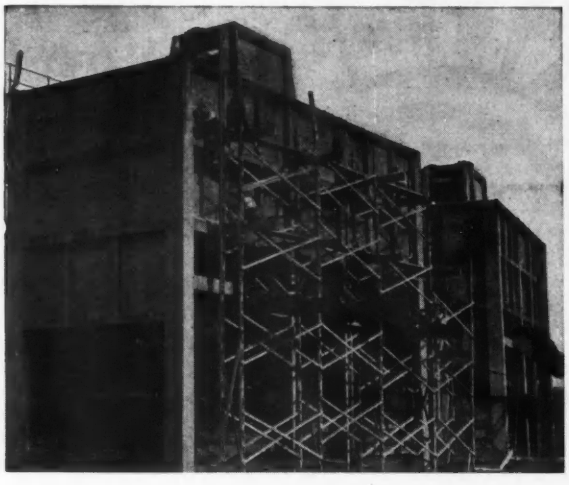
CONVEYORS,
ELEVATORS,
BUNKERS, ROOFS,
HOISTS, Etc.

GOODALL, CLAYTON & Co. LTD.
LEEDS.

COAL AND COKE SCREENING & SIZING PLANTS.

RETORT SETTINGS
PRODUCERS, FURNACES
REPAIRS.

Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

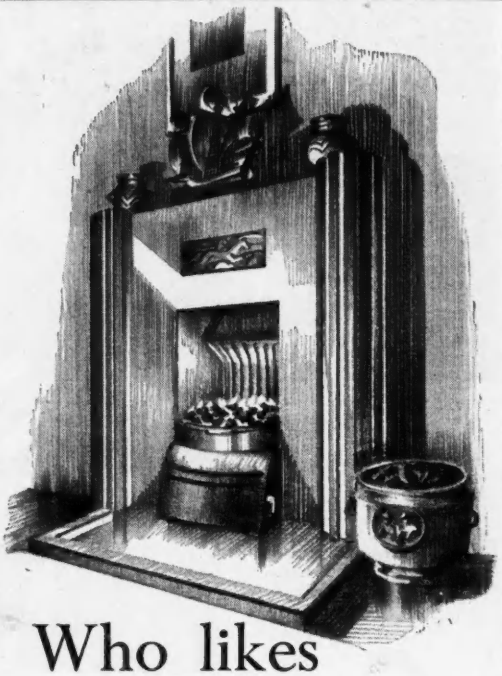
For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke

Handbook "GUNITE" sent on request

THE CONCRETE PROOFING CO., LTD.

100, VICTORIA STREET, S.W.1

Telephone: Victoria 7877 & 6275

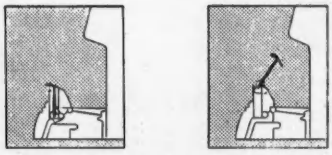


Who likes lighting fires on cold mornings?

Brrrr!

Pre-selected control makes possible an open coke fire which will burn all night, giving a constant flow of warmth in the room and hot water in abundance.

This improved service to the user increases the popular appeal of the Industry's combined fuels — gas for igniting, coke for heating.



By raising a plate, normally concealed behind the fire front, the capacity of the grate is increased sufficiently to maintain a slow-burning fire throughout the night.

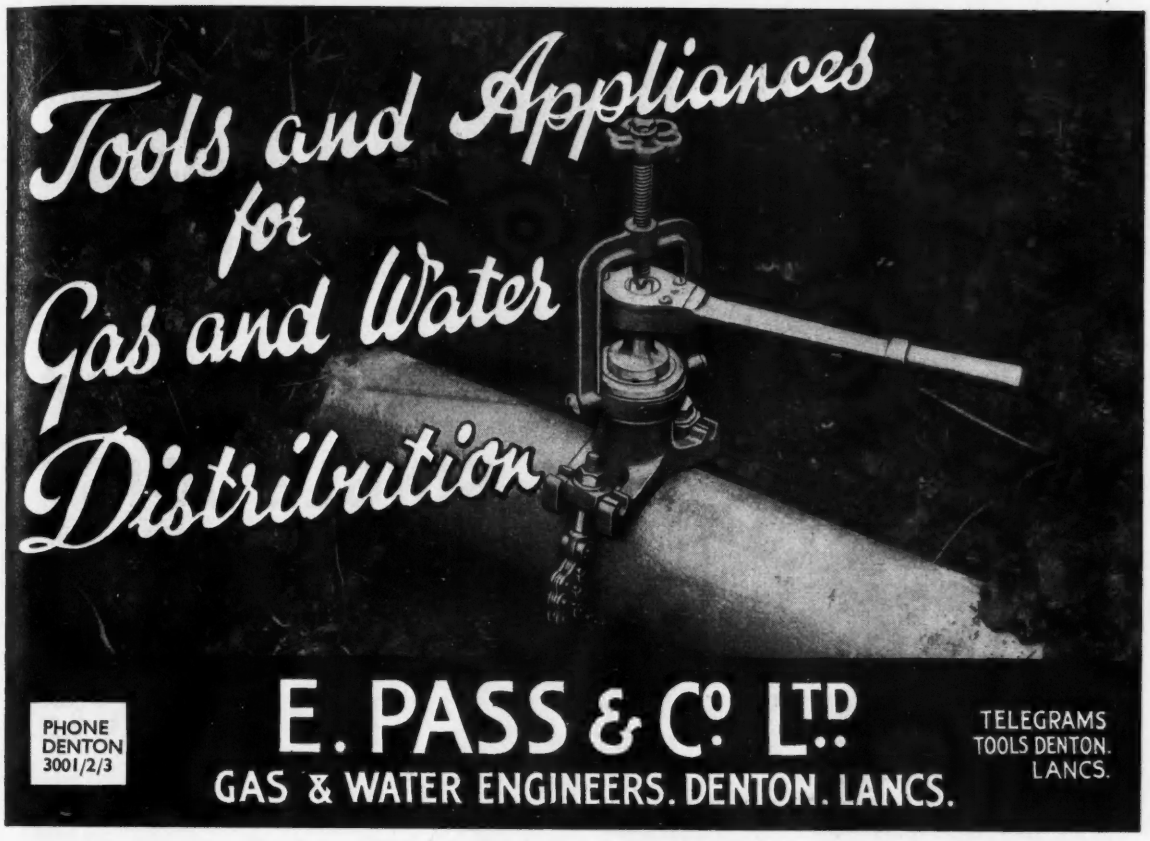
The Sutton

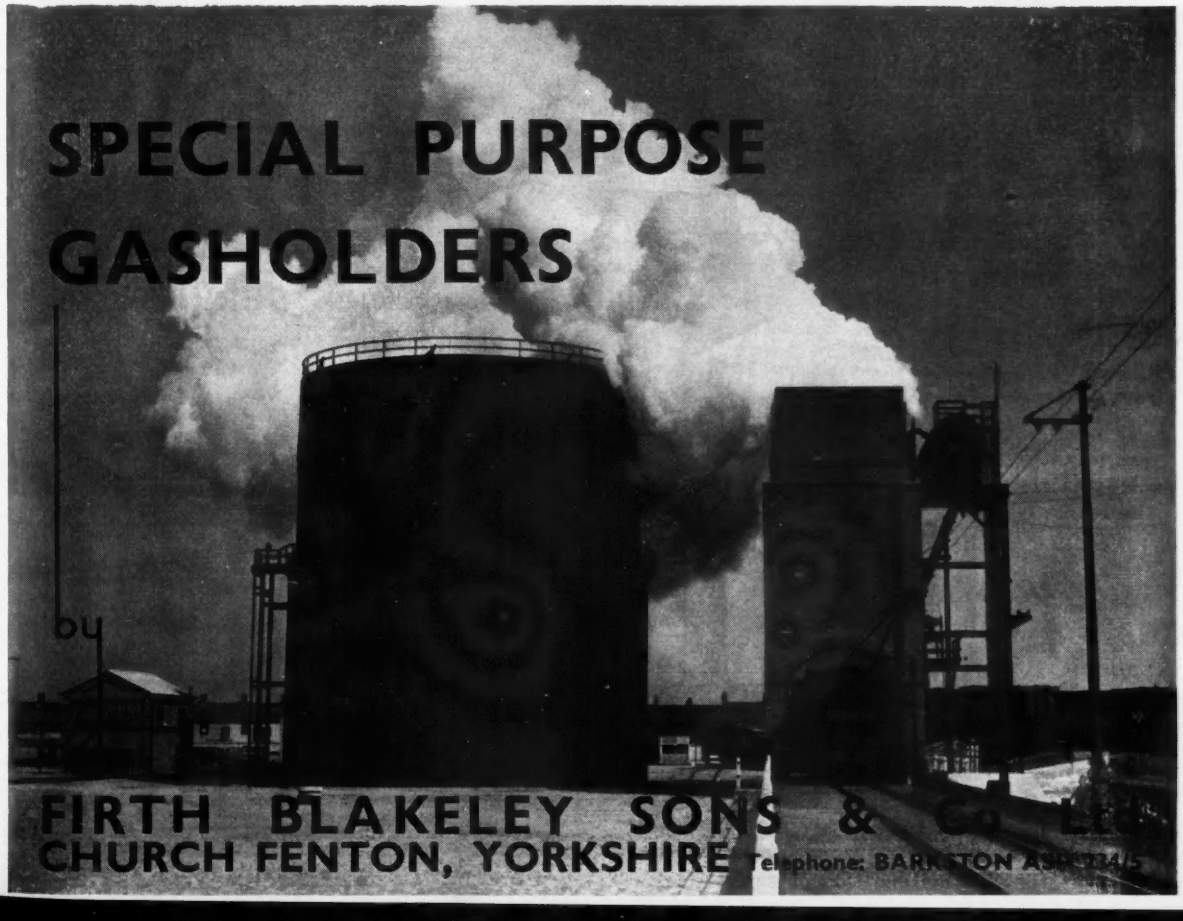
"ALL NIGHT" COKE BURNING GRATE

RADIATION GROUP SALES LIMITED

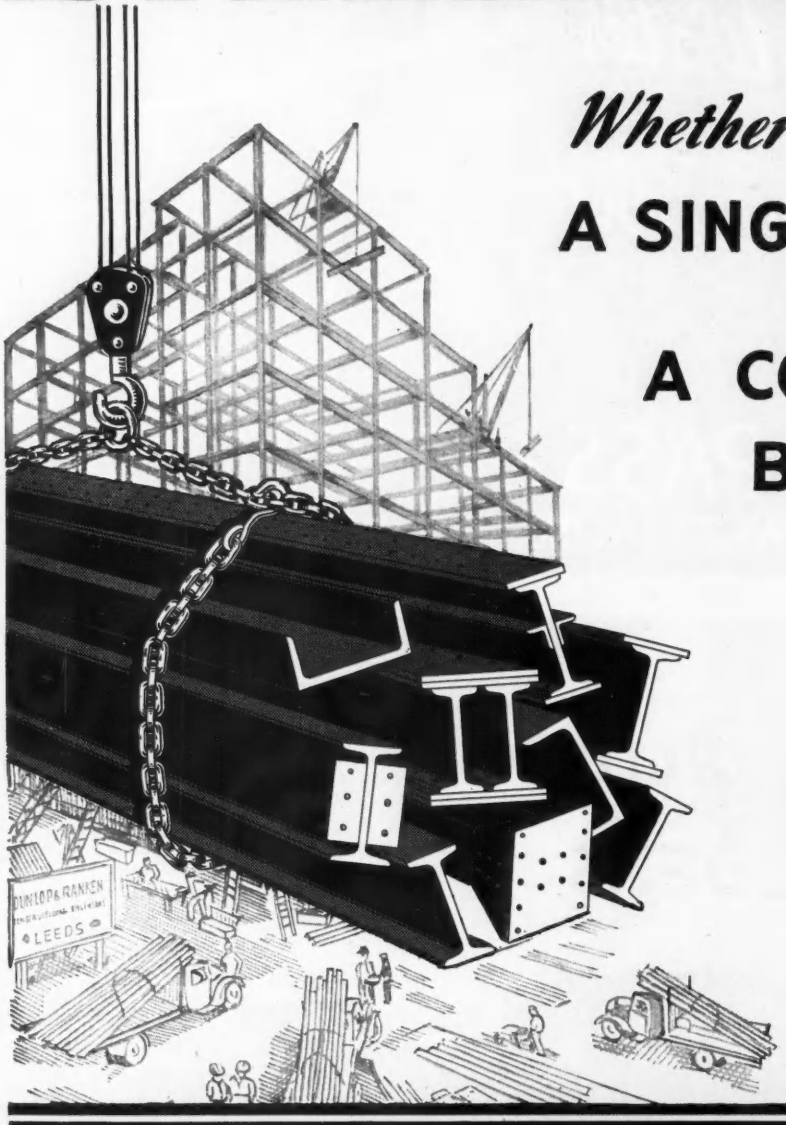
(Solid Fuel Division)

ASTON - BIRMINGHAM 6


Tools and Appliances
for
Gas and Water
Distribution
PHONE
DENTON
3001/2/3
E. PASS & Co LTD
GAS & WATER ENGINEERS. DENTON. LANCS.
TELEGRAMS
TOOLS DENTON.
LANCS.


SPECIAL PURPOSE
GASHOLDERS
FIRTH BLAKELEY SONS &
CHURCH FENTON, YORKSHIRE
Telephone: BARKSTON

STEELWORK



Whether you want

A SINGLE JOIST

OR

A COMPLETE BUILDING

Try

D&R

STEELWORK SERVICE

DUNLOP & RANKEN

LIMITED

TELEPHONE 27301 (20 LINES)

TELEGRAMS SECTIONS LEEDS

LEEDS

INDEX TO 'JOURNAL' ADVERTISERS

PAGE

A

A.C.E. Machinery, Ltd. ... ...
Abbott, Birks & Co., Ltd. ... ...
Accurate Recording Instrument Co. ... ...
Acme Wringers, Ltd. ... ...
Aerogen Co., Ltd. ... ...
Alder & Mackay, Ltd. 153
Ascot Gas Water Heaters, Ltd. ... ...
Ascot Gas Water Heaters, Ltd. (F.A. Neat) Cover IV
Ashmore, Benson, Pease & Co., Ltd. ... ...
Ashworth & Parker, Ltd. ... ...
Aspinall's (Paints), Ltd. ... ...
Associated Lead Manufacturers, Ltd. ... ...
Associated Lead Manufacturers, Ltd. (Rustodian)
Automatic Telephone & Electric Co., Ltd. ...
Automotive Products, Ltd.... ... ...
Averill, C. R., Ltd. ... ...

B

Bagnall, W. G., Ltd. ... ...
Bailey, Sir W. H., & Co., Ltd. ... ...
Bale & Church, Ltd. S2
Balfour, Henry, & Co., Ltd. ... ...
Begwaco Meters, Ltd. ... ...
Bell's Asbestos & Engineering, Ltd. ... ...
Benham & Sons, Ltd. ... ...
Birtley Co., Ltd. ... ...
Blakeley, Firth, Sons & Co., Ltd.... 149
Booth, John & Sons (Bolton), Ltd. ... ...
Bottomley, Thomas, (Grids), Ltd. ... ...
Boydell, E., & Co., Ltd. ... ...
Bratt, Colbran, Ltd. ... ...
Bray, George, & Co., Ltd. ... ...
Bray, W. E., & Co., Ltd. ... ...
Bridges, S. W. & Co., Ltd. ... ...
Bright, Son & Co. (Clerkenwell), Ltd. S2
Bristol's Instrument Co., Ltd. 144
British Flint & Cerium Manufacturers, Ltd. ...
British, Foreign & Colonial Automatic Light Controlling Co., Ltd. ... ...
British Furnaces, Ltd. ... ...
British Gas Purifying Materials Co. ... ...
British Jeffrey Diamond, Ltd. 127
British Oxygen Co., Ltd. ... ...
British Paints, Ltd. ... ...
British Thomson Houston, Ltd. ... ...
British Tyre and Rubber Co., Ltd. ... ...
British Vacuum Cleaner & Engineering Co., Ltd.
Broadbent, Thomas, & Sons, Ltd. ... ...
Brockhouse Heater Co., Ltd. ... ...
Broom & Wade, Ltd. ... ...
Brotherhood, Peter, Ltd. ... ...
Brown, J., & Co., Ltd. ... ...
Bugden, Thos., & Co. ... ...

C

Cambridge Instrument Co., Ltd. ... ...
Cannon Iron Foundries, Ltd. ... ...
Carron Co. 130
Cementation Co., Ltd. 147
Chance Bros., Ltd. ... ...
Chemical Engineering & Wilton's Patent Furnace Co., Ltd. ... ...
Chemical & Insulating Co., Ltd. ... ...
Cinema-Television, Ltd. ... ...
Clapham Bros., Ltd. ... ...
Clayton, Son & Co., Ltd. ... ...
Clifford Engineering Co., Ltd. ... ...
Clough (Croydon), Ltd. ... ...
Cochran & Co., Annan, Ltd. ... ...
Collins, Thomas, & Co., Ltd. ... ...
Concrete Proofing Co., Ltd. 148
Consolidated Pneumatic Tool Co., Ltd. ... ...
Cowper Penfold & Co., Ltd. ... ...
Cox & Danks, Ltd.... ... ...
Crane, Ltd. 128
Crone & Taylor, Ltd. ... ...
Crossley Bros. ... ...
Curtis, Algernon Lewin ... ...
Cutler, Samuel, & Sons, Ltd. ... ...
Cuxson Gerrard & Co., Ltd. 138

D

Decel Engineers, Ltd. ... ...
De la Rue, Thomas, & Co., Ltd. (Potterton Gas Division) ... ... Cover I
Dempster, R. & J., Ltd. ... ...
Dempster, Robert, & Sons, Ltd. ... ...
Derbyshire Silica Firebrick Co., Ltd. ... ...
Dewrance & Co., Ltd. ... ...
Diaphragm & General Leather Co., Ltd. ...
Dick, R. & J., Ltd. ... ...
Donkin (The Bryan) Co., Ltd. ... ... Cover II
Douglas, Robert M., (Contractors), Ltd. ... ...
Douglas, William, & Sons, Ltd. ... ...
Drakes, Ltd.... ... ...
Drew, H. B., Ltd. ... ...
Dunlop & Ranken, Ltd. 150

E

E.B. Refractory Cement Co., Ltd. ... ...
Edgar, William, & Son, Ltd. ... ...
Electroflo Meters Co., Ltd. ... ...
Electrolux, Ltd. ... ...
Elliott Bros. (London), Ltd. ... ...
Erskine, Heap & Co., Ltd.... ... ...
Ether, Ltd. 134
Evans, Joseph, & Sons (Wolverhampton), Ltd. ...
Eversbed & Vignoles, Ltd.... ... ...
Ewart Chainbelt Co., Ltd. ... ...
Ewart & Sons, Ltd.... ... ...
Expanded Metal Co., Ltd.... ... ...

PAGE

F

Falk Stadelmann & Co., Ltd. ... ...
Fibreglass, Ltd. ... ...
Filtrators, Ltd. ... ...
Flavel, S., & Co., Ltd. 181
Fluxite, Ltd.... ... ...
Four Oaks Spraying Machine Co., Ltd. ... ...
Franki Compressed Pile Co., Ltd. ... ...
Fraser & Chalmers, Engineering Works ... ...
Fry's Metal Foundries, Ltd. ... ...
Fyffe & Co., Ltd. ... ...

G

Gas Chambers & Coke Ovens, Ltd. ... ...
Gas Purification & Chemical, Ltd. S2
General Descaling Co., Ltd. ... ...
General Gas Appliances, Ltd. 135
Gibbons Bros., Ltd. ... ...
Gibbons (Dudley), Ltd. ... ...
Gimson, J., & Co. (1919), Ltd. 138
Glover, George, & Co., Ltd. 127
Glover, Thomas, & Co., Ltd. 154
Goodacre, William, & Sons, Ltd. ... ...
Goodall Clayton & Co., Ltd. 147
Goodyear Mechanical Goods ... ...
Grant, David, & Co., Ltd.... 129
Graphite Products, Ltd. 144
Green & Boulding, Ltd. ... ...
Guest, Keen & Nettlefolds (Cwmbran), Ltd. ...

H

Hamilton, A. H., & Co., Ltd. 142
Hardman & Holden, Ltd. 141
Harris & Pearson, Ltd. ... ...
Harrisons (London), Ltd. S2
Harvey, G. A., & Co. (London), Ltd. 129
Hawkins, W. T., & Co. ... ...
Heaths (Eccles), Ltd. ... ...
Hayward Tyler, & Co., Ltd. ... ...
Helliwells (Treforest), Ltd. ... ...
Hewitt Construction Co., Ltd. ... ...
Hickson's Timber Impregnation Co. (G.B.), Ltd. ...
Hilmor, Ltd.... 142
Holden & Brooke, Ltd. ... ...
Holmes, W. C., & Co., Ltd. S5
Honeywell-Brown, Ltd. ... ...
Hopkinsons, Ltd. ... ...
Horseley Bridge & Thomas Piggott, Ltd. ...
Horstmann Gear Co., Ltd.... ... ...
Howden, James, & Co., Ltd. ... ...
Hughes, F. A. & Co., Ltd. ... ...
Humphreys & Glasgow, Ltd. 152

I

Ideal Boilers & Radiators, Ltd. ... ...facing p. 175
I.C.I. Metals, Ltd. 137
Incandescent Heat Co., Ltd. ... ...
Ingham, John, & Sons, Ltd. ... ...
International Coin Counting Machine Co., Ltd.
International Combustion, Ltd. ... ...

J

Jeavons, E. E., & Co., Ltd. ... ...
Jeavons Engineering Co. 134
Jenkins, W. J., & Co., Ltd. 133

K

Keay, E. C. & J., Ltd ... ...
Keith Blackman, Ltd. S6
King, Walter, Ltd. 144, S3
Kings Patent Agency, Ltd.... ... ... S2
Kirk & Co. (Tubes), Ltd. ... ...
Kirkham Hulett & Chandler, Ltd. ... ...
Kleen-e-ze Brush Co., Ltd. ... ...
Kleenoff Co.... ... ...
Klinger, Richard, Ltd. 143

L

LaFarge Aluminous Cement Co., Ltd. ... ...
Laidlaw, R., & Son (Edin.), Ltd. 130
Lamont, James H., & Co., Ltd. ... ...
Lancashire Dynamo & Crypto, Ltd. ... ...
Lawler, Ayers & Co., Ltd.... 142
Lead Industries Development Council ... ...
Le Bas Tube Co., Ltd. ... ...
Leeds X.L. Fire Cement Co. S2
Lionweld, Ltd. ... ...
Lind, Peter, Ltd. ... ...
Londex, Ltd. ... ...

M

Macpherson, Donald, & Co., Ltd. 132
Magnetic Valve Co., Ltd. ... ...
Main, R. & A., Ltd. 182, 183
Mavor & Coulson, Ltd. 145
Meltham Silica Fire Brick Co., Ltd. ... ...
Messenger & Sons, Ltd. 144
Meters, Ltd.... ... ...
Metropolitan Leather Co., Ltd. ... ...
Milnes Meters, Ltd. S1
Mitchell, H., & Co.... ... ...
Morris Commercial Cars, Ltd. ... ...

N

Nash & Thompson, Ltd. ... ...
National Benzole Co., Ltd. ... ...
Neil & Spencer, Ltd. ... ...
Newton Chambers & Co., Ltd. ... ...
Niagara Screens (G.B.), Ltd. ... ...
Nordac, Ltd. ... ...
Nu-Swift Engineering, Ltd. S2

O

Orme, Evans & Co., Ltd. ... ...
Oxley Engineering Co., Ltd. ... ...

P

Parkinson & Cowan (Gas Meters), Ltd. 154
Parkinson Stove Co., Ltd. ... ...facing p. 174
Pass, E. & Co., Ltd. 149

PAGE

Peckett & Sons, Ltd. 139
Peebles & Co., Ltd.... ... ...
Perl Controls, Ltd. ... ...
Platt, Samuel, Ltd. ... ...
Power Gas Corporation, Ltd. ... ...
Powers-Samas Accounting Machines (Sales), Ltd.
Press, William, & Son, Ltd. Supp. between pp. 174-5
Pulsometer Engineering Co., Ltd.... ... ...

R

Radiant Heating, Ltd. ... ...
Radiation, Ltd. 148, 170, 171
Rawlplug Co., Ltd. ... ...
Reavell & Co., Ltd.... 136
Riley, A. J., & Son, Ltd. ... ...
Royles, Ltd. ... ...
Rozalex, Ltd. ... ...
Russell, R., & Sons, Ltd. 142

S

S. & F. Contracting Co., Ltd. ... ...
Salter, T. E., Ltd. ... ...
Saunders, H. A., Ltd. ... ...
Scottish Non-Ferrous Tube Industries, Ltd. ...
Sentinel (Shrewsbury), Ltd. ... ...
Siebe Gorman & Co., Ltd. 136
Sigma Instrument Co., Ltd. ... ...
Simon-Carves, Ltd.... ... Supp. between pp. 174-5
Simon, Richard, & Sons ... ...
Sisson, W., & Co., Ltd. ... ...
Slingsby, W., & Co., Ltd. ... ...
Smith Meters, Ltd. ... ...
Spencer Bonecourt, Ltd. ... ...
Sperryn & Co. ... ...
Standard Furnace & Setting Co., Ltd. ... ...
Stanton Ironwork Co., Ltd. ... ...
Staveley Iron & Chemical Co., Ltd. ... ...
Steel Equipment Co., Ltd.... ... ...
Stein, John G., & Co., Ltd. ... ...
Stewart & Gray, Ltd. ... ...
Stewarts & Lloyds, Ltd. ... ...
Stoves, Ltd. ... ...
Strachan & Henshaw, Ltd. ... ...
Stringer Bros. ... ...
Sugg, William, & Co., Ltd. ... ...
Sutcliffe Speakman & Co., Ltd. ... ...
Sutherland, A. G., Ltd. ... ...
Swallow Coachbuilding Co. (1935), Ltd. ... ...

T

Tarslag, Ltd. ... ...
Taylor, F., & Sons, Ltd. ... ...
Thermo Control Installations, Ltd. ... ...
Thomas & Bishop, Ltd. ... ...
Thomas (Richard) & Baldwins, Ltd. ... ...
Thompson, John, Conveyor Co. ... ... Cover II
Thorp, Thomas, & Co., Ltd. ... ...
Tully, Sons & Co., Ltd. ... ...
Turners Asbestos Cement Co., Ltd. ... ...

U

Ufix Boiler Co., Ltd. ... ...
Underpressure Engineering Co., Ltd. 147
United Kingdom Construction & Engineering Co., Ltd. ... ...

V

Vale, Thomas, & Sons, Ltd. ... ...
Vanda Meters, Ltd.... 138
Visco Engineering Co., Ltd. ... ...
Vulcan Stove Co., Ltd. ... ...

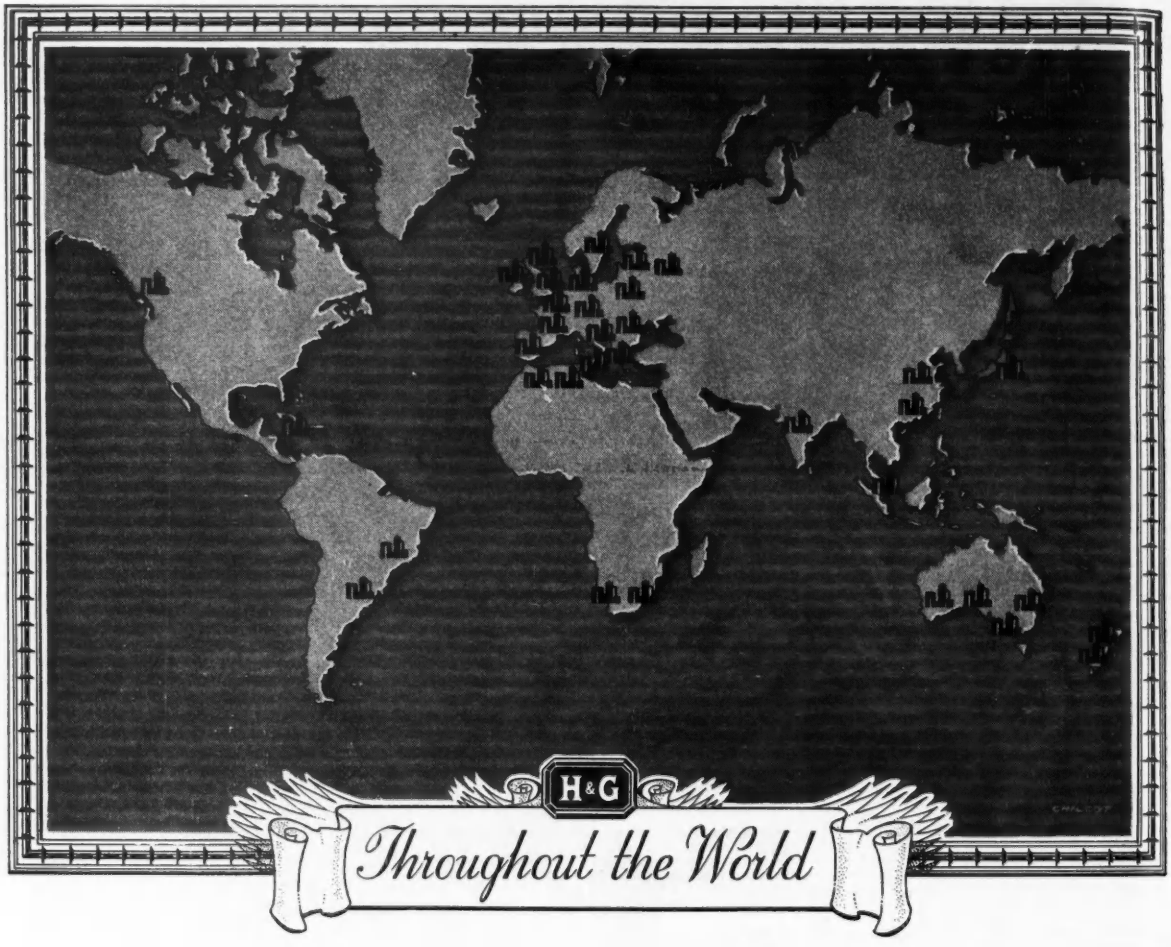
W

W.D. (Sheeters), Ltd. 144
Wailes Dove Bitumastic, Ltd. 140
Wakefield, C. C., & Co., Ltd. 172
Wakelin, F. H., Ltd. ... ...
Walker, C. & W., Ltd. S1
Walker, Crosweller & Co., Ltd. ... ...
Waller, George, & Son, Ltd. ... ...
Ward, Thos. W., Ltd. ... ...
Wellington Tube Works, Ltd. ... ...
Wellman Smith Owen Engineering Corpn., Ltd. 146
West's Gas Improvement Co., Ltd. ... Cover III
West Hunwick Silica & Firebrick Co., Ltd. ...
West's Piling & Construction Co., ...
Westwood & Wrights, Ltd. ... ...
Whessoe, Ltd. 131
Whitehouse, Wm., & Co., Ltd. ... ...
Whittaker Ellis, Ltd. ... ...
Wilkes, A. H., & Co., Ltd. ... ...
Willey & Co., Ltd. ... ...
Williams, John E., Ltd. ... ...
Williamson Cliff, Ltd. ... ...
Wilson, George, Gas Meters, Ltd. ... ...
Winn & Coales, Ltd. ... ...
Woodall-Duckham Vertical Retort & Oven Construction Co. (1920), Ltd. 169
Wood, Hugh, & Co., Ltd. ... ...
Wright, Alexander, & Co., Ltd. 147

Y

Yorkshire Copper Works, Ltd. ... ...

Appointments Vacant S2, S3, S4
Appointments Wanted ... ...
Business For Sale ... ...
Contracts Open ... ...
Educational ... ...
Financial ... ...
Miscellaneous ... ...
Patents S2
Plant For Sale S4
Publications ... ...
Repairs S2

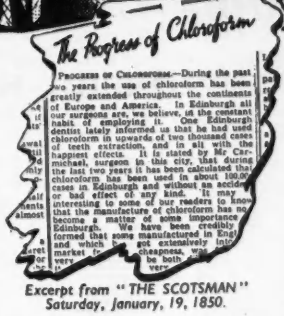


World-wide recognition of the outstanding efficiency & reliability of Humphreys-Glasgow Water-Gas Plants as illustrated by the ever-increasing number of installations.

Humphreys & Glasgow Ltd

HUMGLAS HOUSE · CARLISLE PLACE · LONDON · S.W.1 Telephone VICTORIA 3951

100 years ago


The Progress of Chloroform

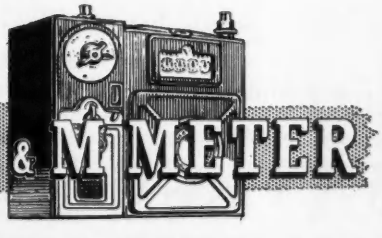
PROGRESS OF CHLOROFORM.—During the past two years the use of chloroform has been greatly extended throughout the continents of Europe and America. In Edinburgh all our surgeons are, we believe, in the constant habit of employing it. One Edinburgh dentist lately informed us that he had used chloroform in upwards of two thousand cases of teeth extraction, and in all with the happiest effects. It is stated by Mr. Carmichael, surgeon in this city, that during the last two years it has been calculated that chloroform has been used in about 100,000 cases in Edinburgh and without an accident or bad effect of any kind. It may be interesting to some of our readers to know that the manufacture of chloroform has now become a matter of some importance in Edinburgh. We have been credibly informed that some manufactured in Engl and which got extensively into market cheapness, was found to be both very

Excerpt from "THE SCOTSMAN" Saturday, January, 19, 1850.

THE fact that the capital of Scotland was the birthplace and principal centre of production of both Chloroform and the dry Gas Meter is purely coincidental.

The modern "A. & M." Meter is conclusive evidence that at no time was the Alder & Mackay Company ever affected by anaesthesia. On the contrary this virile and progressive organisation has, for the past 100 years, consistently kept in the forefront of the Meter Industry.

When one visualises the anaesthetist meticulously recording the heart beat of the patient, under chloroform, one cannot fail to appreciate the mechanical precision of the "A. & M." Meter relentlessly recording the movement of the therms and ensuring that not one is lost.



CELEBRATING 100 YEARS' SERVICE TO THE GAS INDUSTRY

ALDER & MACKAY, LTD., *Gas Meter Manufacturers*
EDINBURGH, BRADFORD, MANCHESTER, LONDON, BELFAST and CORK

Gas Journal

103rd YEAR OF PUBLICATION

EDITOR: NORMAN S. SMITH, B.Sc.(Gas Eng.)

11, BOLT COURT, FLEET ST., LONDON, E.C 4.
Telephone: CENtral 2236-7.
Telegrams: Gasking, Fleet.

VOL. 265 NO. 4572 JANUARY 17, 1951

CONTENTS

Page

EDITORIAL COMMENT

Verbosity ... 155
Distribution from Chester ... 155
Standardisation and the Future ... 156
Kitchen Planning ... 156
Royal Technical College Appeal ... 157
Candle-Power ... 157
Smokeless Air ... 157
Behind the Times? ... 157
The Importance of Smith Minor ... 157

NEWS OF CURRENT EVENTS

Personal ... 158
Obituary ... 158
Diary ... 158
News in Brief ... 159
North Thames Kitchen Planning ... 159
Oxford Link-Up ... 161
Institution Accepts Juniors' Offer ... 161
Women's Gas Federation ... 161
Gas at the Schoolboys' Exhibition ... 161
Consultative Councils in Session: Minister Meets East Midlands Council ... 162
Chemical Engineers' Convention ... 163
More Conversion Values ... 163
Newport's Christmas Tree ... 163

FEATURE ARTICLES

Nalgo and Gas Staffs. By L. A. Garratt, National Officer for Gas Staffs ... 160
Public Relations. By Stanley Hopkinson, Public Relations Officer, Liverpool Group, North Western Gas Board ... 164

TECHNICAL RECORD

The Jones Gas-Making Process. By C. L. Taylor, Station Engineer, Cheltenham ... 165
Conversion to Gas of Solid Fuel Central Heating Boilers. By W. E. Whitney, M.Inst.Gas E., Stockton 173
Application of Pre-stressed Concrete to Structural and Building Work. By S. V. Gardner, M.Inst.Struct.E., A.M.I.C.E., Design Engineer (Reinforced Concrete), North Thames Gas Board ... 175

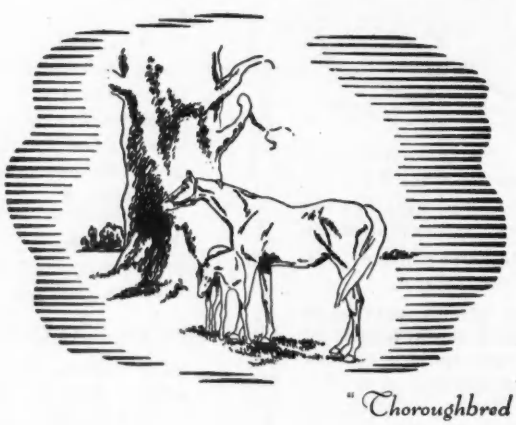
Subscription Rates *Home and Empire 52/-* *Foreign 60/-*

Full Publishers' Notice : See Page S3.

Gas Journal ..... Walter King Ltd.

We also supply 1/- & 2/6 Meters.

THOMAS GLOVER & CO. LTD., EDMONTON, LONDON, N.18, & BRANCHES



"Thoroughbred"

Parkinson & Cowan — the name behind which lies the experience of yesterday, the knowledge of today—and the invention of tomorrow.

PARKINSON & COWAN (GAS METERS) LTD.

Head Office Terminal House, Grosvenor Gardens, London, S.W.1. Telephone: SLOane 0111.

Branches North London, South London, Birmingham, Manchester, Newcastle, Glasgow and Belfast.

GAS JOURNAL

VOL. 265. NO. 4572 103RD YEAR JANUARY 17, 1951

VERBOSITY

WHEN is a paper not a paper? We ask because it is becoming increasingly apparent that many authors of technical papers have lost sight of what is—or should be—expected of them. Brevity is the soul of more than wit; it is the essence of a well-conducted and lively meeting. There is an ominous tendency for papers to become longer, and longer, and longer. What to the author may be his finest hour becomes for the audience an endurance test. Even the probably small percentage of listeners who may be deeply concerned with the paper's subject-matter must, as the minutes slip by, become increasingly prone to cramp, smoker's throat, and those other promptings to which the human frame falls victim. The paper which is read from end to end reached saturation point some time ago. In its place came an even longer paper, only a précis of which was read aloud by the author. Loyal members who may have hopefully regarded this as a possible source of comfort and relief were confounded by a second manifestation of the long-windedness of man—contributions to the discussion became longer. Compulsory volunteers, faced with a weighty mass of facts and figures, presumably felt it incumbent upon them to rise to the occasion and do justice to the immense amount of work the author had put into his effort. An early victim was the Institution of Gas Engineers itself, at whose meetings the discussion became, instead of a series of brief and pithy comments, a collection of satellite papers.

It would appear that nationalisation has further complicated the issue. To judge by results, prospective authors have found improved financial support, for instead of the humble but perfectly adequate duplicated copies, their papers are frequently printed with a degree of lavishness denied the average publisher. The inclusion of numerous photographs has been followed by folding maps, charts, tables, and all manner of artistic supporting material. A recent example is a paper given by Mr. W. H. B. Porter, Distributing Officer to the North Western Gas Board, to the Manchester and District Section of the Institution. Entitled 'Reconstruction of a Distributing System,' this magnificently printed effort boasts a heavy card binding, 32 pages of text, four 21 in. by 14 in. coloured folding maps on art paper, two large folding diagrams on art paper, and eight folding tables; each copy weighs 11 oz. Where is it going to stop? Will colour photography and buckram bindings blaze the trail for still further enormities?.

The solution, we suggest, lies in the utilisation of that overworked phrase, 'a sense of proportion.' We submit the following suggestions to prospective authors: (i) Is your introduction really necessary? (ii) credit your audience with some knowledge of the industry's history; (iii) stick to the point and avoid red herrings; (iv) give only as much data as are necessary to support your argument. By this means only would it be possible to stem the flood of verbosity and the desire to impress, which threatens to turn our authors into gramophones, our papers into encyclopaedias, and our meetings into something so tedious as to defy description.

DISTRIBUTION FROM CHESTER

ALL this mass of detail was no doubt of great interest, and indeed indispensable, to those called upon to approve the general scheme and to decide upon the measures in detail to be adopted to cope with the given situation. But it is difficult to isolate any general principles which might be of use to distribution engineers throughout the industry. Some of the reflections prompted by the paper are not really relevant to the discussion of it.

One fact, for instance, stands out with alarming clarity. It is estimated that in this district there will be an increase of 75% in the demand for gas by 1970. We can see, of course, that this increase is spread over a population which is itself expected to increase by 50%. But is it likely that population elsewhere will correspondingly decline? Records indicate that growth in industrial districts is running at a formidable rate. If this figure were representative of the country as a whole and if present methods and general practice in gas manufacture remain unchanged, it would mean that the gas industry would need annually

a further 15 million tons of coal. Does anyone think for a moment that such an increase would be tolerated? Mr. Wakeford said at Bournemouth all that needs to be said on this point, basing his remarks on a general increase in the gas load of 50% in 20 years, a figure which does not appear at all an exaggeration of what must be expected.

Work of this nature, as of most other classes of engineering, is conditioned by the length of time required for its completion. Mr. Porter suggests two to five years. In the next few years it will be further restricted by the quantity of iron and steel available. What should be the impact of these possibilities on the pressure of distribution through feeder mains—that is, on their size? Are we not a little conservative in this matter by comparison with, say, our American colleagues? No doubt the pressures here selected for the feeder mains give the lowest cost of compression plus capital charges over a working period, but has this been balanced against weight of iron and steel?

One would have thought, too, that in the development of some of the outlying concentrations of consumption points there might be cases where gas might be distributed direct to consumers at definitely higher pressures, through governors. One remembers the proposals of years ago, and that within recent years Mr. Escreet took a favourable view of distribution at medium pressures in a new township. No doubt the difficulties of such a drastic innovation within the old city boundaries might be prohibitive, but the new districts might lend themselves to innovations in this direction. Certain it is that the consumer is more favourably impressed by the maintenance of a sufficient pressure in his supply than by that of the calorific value or any other property. It is well-known that 'low pressure' is, to him, synonymous with 'bad gas.'

Another question arising out of this discussion, a point just touched upon in the paper, is whether gas manufacture is to be kept going at Chester or whether a supply is to be pumped in from one of the big manufacturing stations of Merseyside. This must be one of the borderline cases. The advantages of retaining manufacturing centres of this class of capacity and this degree of isolation are pretty obvious. From the distribution point of view, closing down would appear to mean just the imposition upon the system described so fully in the paper of another super-feeder main several miles in length. But it is becoming apparent that there is another advantage in retaining existing manufacturing stations of moderate (not small) capacity. We mean that of the facility with which methods can be adopted for dealing with peak loads by such means as the use of oil-gas plant, which for some time are likely to be most manageable in relatively small capacities.

There is probably more than one large undertaking in the country which has reached out to the absorption of districts not really contiguous, and which is finding itself involved in a number of difficulties which would not otherwise have befallen it. The reasons which operate so powerfully in favour of the integration of supply and concentration of manufacture in continuous and homogeneous connotations do not, we submit, justify the application of similar measures to groups of undertakings dispersed over relatively wide areas with sparsely populated regions between them.

STANDARDISATION AND THE FUTURE

MASS production, with its attendant features, standardisation and simplification, continues to exert its influence on gas appliances. An interesting example of the way in which close adherence to these aspects of manufacture can result in reduced prices is quoted in the January issue of *Target*, a monthly bulletin produced by the C.O.I. for the Information Division of H.M. Treasury. The manufacturer in question is Richmonds Gas Stove Co., Ltd., of the Radiation Group, and the firm's remarkable achievement lies in the fact that in just over one year the company has raised the production of cookers by 187%, with an increase in employees of one-third, and a decrease of 34% in the price of the appliance. This has been achieved by rigid standardisation, the manufacturing range being reduced from 34 different types, sizes, and finishes to one type with a single finish and four hotplate arrangements as the only variants. Every process was reviewed by a planning engineer and a small team of draughtsmen and rate fixers who advocated the introduction of various types of conveyors throughout the works layout, and many other forms of mechanisation and simplification. As a result productivity has risen and assembly costs have been roughly halved. Taking into account the increase in total fixed charges due to the installation of new plant and other factors, the ratio of overhead costs to wages has been lowered by one quarter. Moreover, the introduction of a team bonus scheme and individual piece rates based on work assessment have resulted in an increase of 15-20% in average earnings, exclusive of overtime payments. There is much to be said for providing the consumer with a wide choice of appliances, but we do not think these facilities are likely to ensure the continued popularity of cooking by gas. On the contrary, the vital factor in the future will be a combination of high efficiency and low price; and it will surely be by such manufacturing methods as those described that energetic competition for the cooking load will be met.

KITCHEN PLANNING

WHETHER we like it or not—and some of us do not—this is an age of planning. The planner is in the ascendant, and little in town or country has escaped his influence. The domestic kitchen came under the designer's pencil years ago, and this resulted in a Kitchen Planning Exhibition at Dorland Hall and provided the women's magazines with an endless belt of eagerly-read material. It became apparent that not only is kitchen planning a very useful and necessary thing, lessening drudgery and improving the housewife's morale and temper, but it is also a thing in which women are passionately interested. Even if they cannot afford the lavish alterations which some kitchen planners advocate, they enjoy thinking about them and reading about their more fortunate sisters who can indulge their fancies *ad lib*. The gas industry knows that a kitchen is as good as its appliances, and that according to whether the housewife likes or dislikes working in her kitchen, so she will like or dislike her cooker, wash boiler, or whatever it may be. For this reason the industry has done much to help women to make kitchen work as easy as possible, not only by providing easily-cleaned, labour-saving appliances, but by advising on kitchen layout, colour schemes, and so on. Before the war the Gas Light and Coke Company had a special kitchen planning service, and it is interesting to note that this is being revived by the North Thames Board. A start has been made by opening a new Kitchen Planning Bureau at their Kensington headquarters, consisting of a full-size model kitchen staffed by specially trained home service advisers. For some months now housewives have been receiving advice on kitchen planning problems, and the bureau has been available on request for visits to customers' kitchens to suggest possible conversions, etc. Last week, however, the scheme was officially launched by the inspection of women editors who will no doubt make the service more widely known. Later the Board hopes to extend the service to a wider area, and perhaps install model planned kitchens at other showrooms.

ROYAL TECHNICAL COLLEGE APPEAL

A PUBLIC appeal to raise funds to help to meet the cost of a £750,000 extension to the Royal Technical College, Glasgow, has been launched by the governors. State assistance has fallen short of expectations, and it is estimated that not less than £350,000 will be required to complete and equip the building and to provide a moderate endowment for research. The new block, which will house the whole of the civil and mechanical engineering department, is to be built on a site adjoining the present building which was itself financed mainly by public subscription amounting to £300,000. Completed in 1910, the college is the oldest of its kind in the world. Increased demand for trained scientists and technologists and the growth in the number of students are the reasons given for the necessity to extend the college.

CANDLE-POWER

INDIVIDUALISM is a trait to be admired. We maintain that it is the rugged individualism of the Briton rather than the roast beef of old England (or what is left of it) that has made us what we are today. While, at the injunction of the harassed Minister of Fuel and Power, all over England the lights and fires once more go dim—and one wonders whether they will again be fully lighted in our time—a few brave beacons shine out in the pervading gloom to remind us of those brighter days. Among them are a neon sign in Trafalgar Square and the gas showroom window in Wigan. Here is a town, which has enjoyed for many years the merry and merciless cracks of music hall comedians, determined not to let its much advertised pier provide its only claim to fame. Rather does it join the ranks of those sturdy individualists of whom it shall be said 'They have this day lighted an Aladdin lamp which even the Minister of Fuel and Power shall not put out.'

SMOKELESS AIR

THE winter issue of *Smokeless Air*, quarterly journal of the National Smoke Abatement Society has re-discovered a (dare we say?) long-forgotten speech by George Bernard Shaw to the Coal Smoke Abatement Society at its annual meeting in 1911. Urging the Society to carry on with its work despite lack of funds, Shaw described how dirty he found London when he first came there from Ireland. Being an Irishman, the smoky, dirt-laden atmosphere of London in those days struck him particularly forcibly, for, as he observed, one had to be an Irishman to understand the antipathy and instinctive dislike that every Irishman had to washing. The fact of the matter was that washing was not a natural function. It was true that Shaw got into the habit of taking a cold bath; but that was not washing. He did it as a stimulant and often thought he had better have taken to whisky. The real secret of healthy cleanliness, said Shaw, is to have a clean atmosphere and clean clothes—which, we conclude, will obviate any necessity to wash and provide an Irishman's (and a schoolboy's) paradise. The same issue contains an article on the Coalite low-temperature carbonisation process—one of a series of contributed surveys in which the history, production, properties, and future outlook of solid smokeless fuels are described. The celebrations of the Society's coming-of-age have been sadly overshadowed by the sudden death of their Chairman, Charles Gandy, who had occupied that position without a break since 1934 and was a member of the Executive Committee since the formation of the Society in 1929.

BEHIND THE TIMES?

As a reminder that the 1951 British Industries Fair will soon be with us (it is to be held from April 30 to May 11), comes the usual survey of the Fair published by *The Times*. Perhaps because this will be the centenary of the Great Exhibition of 1851, and because this is festival year, the publishers have excelled themselves by producing a larger, sleeker, and glossier, annual than usual. For its colour printing alone this is worthy of high praise, and this quality is amply supported by attractive typographical layout. In the engineering field articles range in subjects from mining, mechanical handling, and machine tools, to petroleum equipment and electricity generation. The latter subject is dealt with in a two-page article entitled 'The Growing Power of Electricity,' which traces the historical development of the industry and briefly surveys current trends in harnessing new sources of energy. That the rapidly expanding electricity industry should be included in a report on British industrial progress is as it should be. What occasions surprise is the fact that no mention of the gas industry occurs in the publication. Is not the gas industry contributing its share to our national recovery, and has it not shown that both in the fields of manufacture and utilisation, important progress is being made? Presumably, those responsible for compiling this survey were not aware of these facts; if not, it should have been someone's business to tell them. The story is there, but surely it is up to us to see that our industry's development is made known to everyone, and The Times Publishing Co., Ltd., in particular. It is to be hoped that in future years some thought will be given to this important matter—important because this survey has very considerable prestige value. And in view of this, would not the survey be an obvious medium for gas industry prestige advertising?

THE IMPORTANCE OF SMITH MINOR

WATCHING the lions fed at the London Zoo is a tame occupation compared with watching the customers at the Schoolboys' Exhibition last week. Signs of their pilgrimage to this Mecca of schoolboy ideals were visible within a considerable radius of the Horticultural Halls. There were boys everywhere, and most of them were eating. Inside the exhibition eating became the over-riding pastime, and a staple diet of potato crisps, ice cream, and Coca Cola apparently gave its adherents superhuman strength and endurance. Fortunately, there were plenty of outlets for youthful energy, both official and unofficial, and while exhausted parents pleaded for mercy, their offspring relentlessly explored the many exhibits of interest. Apart from the more obviously trade stands, the atmosphere of exhibits generally was remarkable for its insistence on recruitment. The Forces, the Ministry of Supply, the National Coal Board, and the gas and electricity industries were among those offering 'a job with a future,' and competition for likely lads appeared keen. The gas stand, sponsored jointly by the North Thames, South Eastern, and Eastern Gas Boards, followed last year's example and featured a puppet show; this time the playlet, 'Down on the Farm,' showed Mr. Therm assisting agriculture in a most entertaining fashion. Sectioned appliances, film strips, a model gas-making plant, and a demonstration of gas fitting by an apprentice, were also shown. The puppet shows, which were given hourly, drew good crowds, but it must be confessed that this could not compete with the more continuous entertainment offered by our electrical competitors. Reluctantly it must be stated that this E.D.A. stand was a wonderful piece of work. With a gay fairground appearance, it combined education with amusement, and was conceived with ingenuity and a keen sense of humour. There were electrically-operated quizzes with push buttons and panels which lit up, working models, and a try-your-strength machine, all of which illustrated the theme, 'What is Your Power Potential?' The stand was cunningly designed to impart a considerable degree of information while preserving the atmosphere of a cheerful fun fair. Youngsters queued to see it, and we would do well to note the lesson which its success can teach us. The gas stand was good, but competition for the boys' attention was remarkably keen, and the extra touch of imagination and understanding of what appeals to the young mind must have paid the electricity industry good dividends. It is wrong to underestimate the discernment of the schoolboy, who is alarmingly shrewd and has exacting tastes, and it is equally wrong to dismiss this as an exhibition of second-rate importance; the boys of today are assuredly the consumers and the employees of tomorrow and their goodwill and enthusiasm is a guarantee of our continued prosperity.

Personal

Mr. David C. Elgin, Chief Technical Assistant to the Cambridge undertaking, has been appointed Technical Assistant at the Headquarters of the Scottish Gas Board.

◇ ◇ ◇

Mr. F. Dawson, formerly Engineer and General Manager of the North Middlesex Gas Company and latterly Manager of the North Middlesex District of the North Thames Gas Board, has been appointed Station Engineer at Harrow in succession to Mr. L. Lacey, whose retirement was announced recently.

◇ ◇ ◇

Mr. J. Muil, A.M.I.E.E., who has been for the last five years with the Technical and Scientific Register of the Ministry of Labour, has been appointed Registrar and Secretary of the Professional Engineers Appointments Bureau, in succession to **Mr. H. J. Nichols,** C.I.E., D.SC., M.I.C.E., A.M.I.MECH.E., who has resigned.

◇ ◇ ◇

The Earl of Verulam, M.A. F.I.I.A., J.P., Member of the North Thames Gas Board, has accepted an invitation to become an additional Patron of the Purchasing Officers' Association. He is Chairman and Managing Director of Enfield Cables, Ltd., and Chairman of Enfield Rolling Mills, Ltd., and of Sternol, Ltd.

◇ ◇ ◇

Mr. George W. Allen, Executive Secretary and Treasurer of the Canadian Gas Association for 35 years, retired from the office on December 31. Mr. Allen has devoted just half of his life in the service of the members and the industry. To fill the vacancy occasioned by Mr. Allen's retirement, the Executive Committee has appointed **Mr. Warner A. Higgins,** of Toronto.

◇ ◇ ◇

Mr. K. C. Mead has been appointed Station Engineer at the Mill Hill works of the North Thames Gas Board. His appointment and that of Mr. F. Dawson to Harrow, mentioned earlier, follow the Board's recent decision to make a division of responsibility in the North Middlesex District. Mill Hill works is now incorporated in Group III; for commercial purposes, however, the name 'North Middlesex District' will be preserved, but the district will work as a unit of the North Western Division. The local mains and services organisation will be subject to the control of the Divisional Mains Superintendent as part of the divisional organisation.

Obituary

JOHN W. McLUSKY

Mr. DAVID FULTON, Member of the Scottish Gas Board, writes :

The death of John McLusky has brought great grief to his multitude of friends in the gas industry in all parts of the world. Since his retirement through indifferent health in 1947 he had been much withdrawn from public contacts, but he was constantly in the minds of his friends for his sympathetic and sensitive nature made friendship with him easy to establish and retain.

Tall, of spare habit, with a high forehead and well marked features; always beautifully groomed, he had a distinguished air which made him a marked man wherever he might be. He attained great distinction in the gas industry, but never forgot the lowly degrees of his own ascent. He was never superior, never aloof, ever ready to lend a sympathetic ear to the trials and troubles of the small works managers and he was just as happy in their company as in the company of the great.

A fluent speaker, with a most agreeable voice, lucid in word and phrase, he had the gift of clear exposition of his ideas and as his numerous contributions to our technical literature show he possessed the attributes of the statesman—vision and foresight; constructive always. Having spent some years in Ireland he could use the brogue with excellent effect in stories such as, saying to the stoker going off shift, 'I see, Pat, that you haven't made as much gas as the last shift,' and getting the response, 'Ah! but, Mr. McLusky, the gas oi've made is far more solider.'

Deeply but not ostentatiously religious, a lover of music and the arts, of a fine sensitiveness, understanding and kindliness, he was a man whom to know was to admire, and those who enjoyed the privilege of his friendship will remember him affectionately as one of nature's gentlemen.

Mr. SIDNEY LANGFORD writes :

The passing of John McLusky will be sad news for a very wide circle of those who were privileged to call him friend, and who knew of the quiet fortitude with which, for some years past, he had fought increasing ill-health.

Many of us will have an enduring memory of a man who, honoured in the profession to which he brought high technical ability, held also the respect and affection of his fellows for his innate kindliness and courtesy at all times.

Modest to a degree, he was yet an outstanding figure in an industry which has produced so many great men. The world is the poorer for his loss.

Diary

Jan. 19.—Eastern Junior Gas Association: 'About the Works,' L. W. Jarrett (Nottingham). Peterborough.

Jan. 20.—Yorkshire Junior Gas Association: 'Concerning Carbonisation,' R. K. Atkinson (Assistant Works Manager, New Wortley Works, Leeds). Wakefield.

Jan. 24.—Industrial Gas Development Committee: Gas Industry House, 9.30 a.m.

Jan. 24.—London and Southern Junior Gas Association: Visit to the works of Electroflo Meters Co., Ltd., Park Royal.

Jan. 25.—North Thames Gas Consultative Council: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Jan. 25.—Midland Junior Gas Association: Afternoon visit to the works of the Rover Motor Co., Ltd., Solihull.

Jan. 25.—Scottish Junior Gas Association (Western District): Annual Dinner and Dance, Beresford Hotel, Glasgow.

Jan. 27.—Wales and Monmouthshire Junior Gas Association (North Wales Section): Colwyn Bay. Address by Mr. Mervyn Jones.

Jan. 29.—West Midlands Gas Consultative Council: Dudley Room, Queen's Hotel, Birmingham, 2.30 p.m.

Jan. 30.—London and Southern Section, Institution of Gas Engineers: 'Water Pollution,' P. Wedgwood, M.SC. (Production Engineer, Watford Division). Institution of Gas Engineers, 17, Grosvenor Crescent, 2.30 p.m.

Feb. 2.—Scottish Junior Gas Association (Western District): Open Discussion Night, Royal Technical College, Glasgow.

Feb. 6.—South Eastern Gas Consultative Council: Adjourned quarterly meeting, Croydon, 2.30 p.m.

Feb. 9.—Institute of Fuel: Brains Trust, 'Coal Preparation, Marketing, Distribution, and Use,' G. S. Jenkins, J. W. Anderson, and H. E. Partridge, Robert Gordon College, Aberdeen.

Feb. 9.—London and Southern Junior Gas Association: 'Education and Training in the Gas Industry,' W. F. Pritchard (Tottenham Division, Eastern Gas Board), 178, Edgware Road, W.2, 6.30 p.m.

Feb. 13.—Institution of Heating and Ventilating Engineers: 'Town Gas and the Heating Engineer,' T. H. Pardoe, R.W.A. School of Architecture, Bristol, 6.30 p.m.

Feb. 13.—Midland Junior Gas Association: 'Outstanding Developments in Ferro-Concrete Construction.' J. A. Milner, Staff Mess Room, West Midlands Gas Board, Birmingham.

Feb. 14.—Institution of Heating and Ventilating Engineers: 'Space Heating,' P. H. Hollingworth, Radiant House, Liverpool, 6.30 p.m.

Feb. 14.—Western Junior Gas Association: Visit to the works of J. W. Singer & Sons, Ltd., Frome.

Civil Engineering in the Gas Industry, by W. S. Stredwick, being Communication No. 365/168 of the Institution of Gas Engineers, is available from the Institution in the form of a 'grey book' at 2s. 6d., post free.

News in Brief

The **Institution of Chemical Engineers** will hold its 29th annual corporate meeting at the May Fair Hotel, London, on May 18. Sir Harold Hartley has been nominated as President in succession to Professor D. M. Newitt.

The **First Public Announcement** of the appointment of a new home service adviser to the Swindon sub-division of the South Western Gas Board was made at a recent meeting of the Swindon Women's Gas Council, when Miss C. Pollard was introduced to the members present. Mr. C. H. Gilbert, Commercial Assistant, who made the introduction, also thanked Miss P. M. Ivens (who is leaving to be married) for her services in this capacity.

A **New Water Gas Plant** erected at Redheugh, Gateshead, for the Northern Gas Board, is now ready to be put into operation. The plant at the beginning will have an output of 2 mill. cu.ft. daily rising eventually to 4½ mill. cu.ft. A new plant being built at Jarrow will be producing about 1 mill. cu.ft. of gas daily by the end of this month, while across the Tyne at Howdon new plant capable of producing 4 mill. cu.ft. daily will be brought into use within 12 months or so.

The Second Brochure issued by the British Constructional Steelwork Association, of Artillery House, Artillery Row, Westminster, S.W.1, gives further examples of structural steelwork design to conform with the requirements of British Standard 449/1948, 'The Use of Structural Steel in Building.'

An Extraordinary Meeting of Bournemouth Gas and Water Company is to be held on January 30 to consider the provisions of a Bill to change the name of the company, to provide for the redemption of the outstanding debenture stock, for the transfer of British Gas Stock to the existing shareholders and for the consolidation of the existing capital; and to authorise additional capital.

Belfast Gasworks has set up new records of output. In the last week of 1950 the consumption was 134 mill. cu.ft., or 12 mill. cu.ft. more than the corresponding period of 1949. The actual daily record was on December 14, when output soared to 21.1 mill. cu.ft. The supply of gas coal, though far from normal, is considered fairly satisfactory. The scarcity of coal for domestic purposes explains the heavy consumption of gas.

When a Fire Broke Out at one of the gasholders at Kettering gasworks during the afternoon of December 28 flames rose 15 ft. into the air and in ten minutes a day's supply of gas was burned. Painters had been working on the holder for some time, and their work was also ruined. It is thought that a hole was made in the metal when the old paint was being chipped off and that the escaping gas was ignited by sparks from an electric drill. Works employees fought the fire until the fire brigade could take over.

Examination Successes.—Three evening students at the Slough Training Centre gained prizes offered by the Society of British Gas Industries. All are employed by the North Thames Gas Board. John Meacock (Sales Representative in training, Uxbridge) gained First Prize and Silver Medal for the final examination. Acting gasfitter Arthur Savage (Slough) gained First Prize and Bronze Medal. Gasfitter Eric Sawyer (Amersham) was awarded Second Prize. The occasion of the South Western Division's successes was marked by the Chairman of the Board (Mr. Michael Milne-Watson), who visited Slough to present the winners with their prizes.

Gas Journal Photo

The new kitchen planning service introduced by the North Thames Gas Board receives editorial comment elsewhere in this issue. Our photograph shows how a model kitchen has been installed in the Kensington Church Street Showrooms, so placed as to attract the attention of everyone entering the showrooms. A specially trained member of the home service staff is in attendance to give advice on kitchen planning and similar matters.

Nalgo and Gas Staffs

BY
L. A. GARRATT,
National Officer for Gas Staffs.

The organisation of the National Association of Local Government Officers has been adjusted to meet the needs of the members in the nationalised industries, and through the district and national consultative committees, 10,000 members in the gas industry have a share in the determination of policy.

THE annual conference of the Association was held at Eastbourne from June 12 to 16. In his opening address at the meeting of gas staff members, Mr. P. Ashen, Chairman of the National Consultative Committee for the Gas Industry, gave this warning: 'If the new administration for the gas industry forgets that spirit of pride in the industry which existed in the past, and indulges in any form of cheeseparing and whittling down of the provisions of the Charter on small things that will not amount to much financially, then, in spite of all the technical efficiency and pride they take in their great efforts in the field of accountancy, they will have failed the gas industry and the nation itself.'

A review was given of negotiations with the Gas Council on the establishment of the national and area joint councils; the holiday agreement; salary scales and conditions of service; hours of work; payments for extra work; equal pay for equal work, and a national sick pay scheme.

National and Area Joint Councils

Nalgo has five seats on the National Joint Council for Gas Staffs, and J. E. N. Davis, Chief Organisation Officer, is on the staffs side and a Joint Secretary of the Council. The Association is represented on each of the area joint councils and its officers are joint secretaries in seven of the 12 areas.

The representatives of the Association took a prominent part in negotiations on salary scales, holidays and conditions of service, and the experience of its negotiators was recognised by both sides, and proved of value in the task of formulating a national agreement, which was by no means easy in view of the widely differing conditions which prevailed prior to vesting date.

From the staffs point of view the agreement does not provide all that may be desired, but it is a foundation on which to build a complete 'Charter.' The National Joint Council for Gas Staffs provides the machinery whereby improvements and additions can be made, and the area boards can do much to foster a happy relationship in the industry, and to retain the traditional loyalty of gas staffs by a fair and reasonable interpretation and use of the elasticity allowed by the agreement.

While the agreement is made between the two sides of the National Joint Council it is the area joint councils who implement it, and naturally, in an industry where each area board is largely autonomous, some misinterpretations are bound to arise. For a time there must be tolerance on both sides, and it is hoped, now that the nationalised industry is getting into its stride, that we shall not lose that personal relationship between the employers, as represented by the boards, area officers, and divisional or group managers, and the ordinary staff members who are, despite any thoughts to the contrary, as keen to do a good job of work and provide an efficient service to the public as ever they were. No man of initiative can tolerate for long being regarded as a mere unit, and while there is ample evidence that board members do not intend that he shall, the very planning and reorganisation taking place within the industry gives this impression to some. If the negotiating machinery, established under Section 57 of the Gas Act, is used in the manner in which its sponsors intended it should be, there will be ample opportunity and scope to iron out any difficulties which might arise.

Senior Officers

Nalgo, together with the Gas Officers' Guild, is recognised by the Gas Council as an appropriate organisation with which to negotiate for the establishment of a National Joint Council for Senior Officers, the constitution of which is expected to be published shortly. The Association has had such officers in membership for the past 40 years and offers them unrivalled services, including a legal department which is recognised as a leading authority on compensation and superannuation.

Nalgo continued to the last ditch its fight for more generous compensation provisions for gas officers made redundant, or who suffer a loss or diminution of emoluments or pension rights as a result of nationalisation. Prior to their being debated in Parliament Nalgo was afforded the opportunity of meeting officials of the Ministry of Fuel and Power to discuss the draft regulations. Strong objection was taken to the provision that an officer who had no reasonable expectation of obtaining compensation in the event of determination of his employment before vesting day, should only be paid compensation for a period of 13 weeks, with an additional week for each completed year after attaining the age of 45 years, and with a maximum in any case of 26 weeks. Nalgo made representations to the Ministry that this was a serious departure from the compensation code contained in the regulations for the health, national assistance, local government, and town planning services. The Association pointed out that there was a long record of compensation for loss of office in local government, but the compensation provisions of the Local Government Act, 1933, did not apply automatically to every local government officer. The Association took part in a deputation to the Minister of Fuel and Power. It stated its claim again in the House of Commons, and it repeated it when the Regulations went to the House of Lords.

The Association's objections were voiced in the House of Commons by Mr. T. W. (now Lord) Burden, C.B.E., but despite an eloquent plea, both there and by Lord Teynham in the House of Lords, the Government refused to amend the proposals.

Legal Matters

Many hundreds of claims and cases were dealt with during the year by the Legal Department. An outstanding case was that taken to the Gas Arbitration Tribunal on behalf of a former company general manager, where a gas board attempted to disclaim an agreement whereby the manager was entitled to an annuity, or alternatively a capital sum on his retirement. The Tribunal revoked the notice of disclaimer given by the area board, and directed that the manager should be awarded the costs of the proceedings.

A National Joint Standing Committee for Intermediate Grades, being a tripartite committee of five representatives each from the Gas Council, the N.J.C. for Gas Staffs, and the N.J.I.C. for the Gas Industry, was established during the year, and Nalgo, which fills two of the seats held by the N.J.C., is represented by Mr. J. E. N. Davis (Staffs Secretary) and the writer.

Towards the end of the year, and after protracted negotiations, agreement was reached on scales of pay and conditions of service for these grades.

Area joint standing committees have been, or are being, set up in each area, with a similar representation to that of the National Committee. It is the duty of these committees to implement the national agreement, and the area boards are now grading this class which falls between the two joint councils covering the bulk of gas employees.

Co-Partnership

Nalgo shares the view with other organisations that co-partnership schemes in their present form cannot continue in the nationalised industry, unless the Gas Council is prepared to extend them to all employees. This it is not prepared to do, and it has been agreed that co-partnership shall cease at the end of March. The Association has, with other organisations representing staff and manual workers, discussed this problem with representatives of the Gas Council, and has joined in the representations made that adequate and equitable compensation should be paid to co-partners for their anticipated loss of bonus. Nalgo shares the view that the Gas (Staff Compensation) Regulations do not provide an adequate means of doing this, and fully supports the view that another

method should be found to deal with this problem, which affects such a large percentage of those employed in the industry.

Equal Pay

Nalgo stands for equal pay for men and women—for the rate for the job whether the job is done by a man or woman—and for equality of opportunity. In most of the recognised professions—law, medicine, accountancy, architecture, journalism—there is equal pay. Members of Parliament of both sexes get the same. So do bus conductors, employees of the B.B.C. and university teachers. Why, then, should women employed in equal jobs in the gas industry get less than men?

The Association believes that the securing of equal salary standards in the local government and public services would not in itself satisfy the reasonable aspirations of the women. There is a tradition based on bad old practice, that women shall, in the main, fill routine posts; few of the more responsible posts are filled by them. This is bad for the service. Efficiency should be the only test.

Nalgo has pressed its claim for equal pay for equal work in the N.J.C. for Gas Staffs. The employers are at present unable to accept this principle nationally; they contend it is a matter for a national lead, and until the Government are prepared to give this lead the gas employers are not disposed to agree. Nevertheless, Nalgo will continue to press for equal pay on all suitable occasions.

Oxford Link-up

A link in the scheme of integration designed by the Northern Division of the Southern Gas Board was completed recently, when Mr. Alexander Tran, Divisional General Manager, turned on a supply of gas from Oxford to the gasworks at Shipton-under-Wychwood, where the manufacture of gas has now ceased. To supply Shipton, a new main has been laid, starting from the western extremity of the existing high pressure distribution system at Witney, and this main is now being extended to supply Charlbury and Chipping Norton.

It is expected that the new supply will be available in Charlbury by the end of March, and at Chipping Norton by the end of the year. The route of the new main will pass through several villages and gas will be made available eventually to many rural residents for the first time.

The Board is anxious to give to existing and new consumers in the smallest towns and villages the same high standard of service enjoyed by consumers in the large towns, but it realised that this policy was quite impossible of fulfilment if the old and worn-out small works were allowed to continue in production. It was therefore faced with the task of undertaking the costly reconstruction of the small works or, alternatively, supplying gas from the nearest large undertaking. Wherever practicable, the Board has decided that the most economical means of supplying gas to country areas is to link the small works with the larger undertakings.

Institution Accepts Juniors' Offer

It was announced by Mr. J. D. C. Woodall (Senior Vice-President), who was presiding at the meeting of the London and Southern Junior Gas Association on January 12 in the absence through indisposition of the President, that the Institution of Gas Engineers had accepted the offer of the British Junior Gas Associations' Joint Council to present a symposium of short papers at the summer meeting. This offer was mentioned on page 141 of the *Journal* for November 8.

The Joint Council offers a prize for the best paper. It was requested that the papers be limited to about 3,000 words, and it was proposed to devote some two hours to the session—half-an-hour or a little less per paper; there would be four or five papers. The author would be expected to present his paper in five to seven minutes, leaving 20 or so minutes for discussion.

Mr. Woodall expressed the hope that some of their members would come forward with papers, which should be in the Hon. Secretary's hands not later than January 24.

A paper entitled 'The Performance of Continuous Vertical Retorts' was read by Mr. C. H. Lewis, M.SC., of the North Thames Gas Board's Research Laboratories at Fulham. The paper, which will be published in a subsequent issue, dealt with results obtained in performance tests on Woodall-Duckham continuous vertical retorts over a period of 27 years.

Women's Gas Federation

At a special general meeting of the Women's Gas Council on January 8, it was unanimously resolved to change the name of the organisation from Women's Gas Council to Women's Gas Federation.

The change of name has been considered advisable in order to avoid confusion between the Gas Council, the official body established by Act of Parliament, and the Women's Gas Council, a voluntary organisation.

The full title of the organisation will now be the Women's Gas Federation (Federation of Women's Gas Circles and Associations).

Local units will call themselves branches, unless specially wishing to adopt some other name, *e.g.*, Circle or Guild, to which will be added the words 'Branch of the Women's Gas Federation.' The change of name coincides with some new developments, and the Federation has pleasure in announcing that Dame Vera Laughton Mathews, Adviser on Women's Affairs to the Gas Council, will be giving attention to the plans of the Federation during the coming months.

New Coke Ovens.—The Cargo Fleet Iron Co., Ltd., Middlesbrough, has put into operation a battery of 22 coke ovens which will produce metallurgical coke for use in the firm's furnaces.

Stockton-on-Tees Town Council is to oppose a new system introduced by the Northern Gas Board for charging for street lighting which would increase Stockton's annual charges from £5,608 to £8,223.

Enclosing an Advertisement which states that gas 'is always available and so convenient,' a Menston consumer has sent a letter to the North Eastern Gas Board, in which she writes: 'Do not be so smug. Always available, indeed! My gas went out five times while I was cooking Christmas dinner. If that is what you call "always available," you do not speak the same language as Menston people, who are so fed up with the lack of supply in the last few months that they are considering getting up a petition about it. Before you spend public money on footling advertisements, find out the facts.'

The North Thames, South Eastern, and Eastern Gas Boards combined to produce this stand at the Schoolboys' Exhibition. It featured a puppet show, a demonstration of gas fitting by an apprentice, sectional appliances, and other items of interest to youthful visitors. A comment on the exhibition is published on p.157.

CONSULTATIVE COUNCILS IN SESSION

Minister Meets East Midlands Council

APPEALING for judicious use of gas, Mr. P. J. Noel-Baker, Miniser of Fuel and Power, who is M.P. for Derby South, told the East Midlands Gas Consultative Council, at a meeting at Derby on January 2, that housewives could make a great contribution to the solving of the present fuel difficulties if they saved two minutes burning of gas for every 20 minutes used. This, he said, would result in 800,000 tons of coal being saved between now and April.

He recommended several other ways of saving gas, for example using smaller rings, matches, etc., and added 'don't let anyone think that by using gas with knowledge and wisdom they are damaging the uses of gas. We have got to get the best out of our resources,' and he thought the Consultative Council could play a useful part in helping to achieve this.

Mr. Noel-Baker said the coal problem of the next few months was grave and urgent, and the problem of the next few years was equally important. He was greatly interested in the underground gasification experiments which were in progress near Chesterfield and which he thought might eventually lead to millions of tons of coal not suitable for mining being converted into gas.

Referring to the nationalisation of the industry, the Minister said there was a danger that contact between consumer and producer might not be so great as before, and he stressed the importance of the consumer being heard. 'You and the Board have a common task in promoting the best possible service to the consumer. You have a special task in advising a wiser user use of our fuel resources than in the past,' he said, adding that our industrial and political greatness had been built on coal and that today it was still a vital asset to the nation.

Advertising Policy

Giving consideration to a letter from the Great Grimsby Incorporated Chamber of Commerce and Shipping regarding the advertising policy of area boards, and expressing a view that now both gas and electricity had been nationalised it seemed ridiculous to encourage competition between them, the Council replied in a written statement read by the chairman, Alderman C. R. Bates.

The Chairman said it had been stated by Ministers that competition between the gas and electricity industries will be one of the best forms of protection for consumers, and will tend to ensure an efficient service by each industry. In many parts of the East Midlands Gas Board's area showrooms at present were either inadequate or non-existent, and without a reasonable degree of advertising it would not be possible to bring to the notice of consumers the various services offered by the Board.

Advertising carried out during the past 12 months had led to a largely increased sale of gas appliances, and the cost of advertising had been borne by these sales and had not been a charge on the consumers through their gas bills. These increased sales of appliances have enabled favourable contracts to be made with manufacturers, and a substantial saving in costs has thereby been obtained.

Alderman Bates said it was a mistake to assume that the advertising of the East Midlands Gas Board was necessarily directed against electricity boards. One of its principal objects was to let the consumer know in what way the obsolete appliances now in use could best be replaced so that a subsequent economy in the consumption of gas could be obtained. At vesting date there were more than 250,000 obsolete gas cookers in use which were the property of the Board, apart from those belonging to consumers. Furthermore, much cooking and water heating was carried out by solid fuel which the Board believed could be more efficiently and more economically performed by the use of gas.

A resolution that the letter be noted was carried.

Press Co-operation

The Lincolnshire Divisional Committee submitted a resolution requesting the Chairman to ask for the co-operation of the Press in respect of the need to keep the public informed of the activities and functions of the Council and divisional committees, and that, subject to the approval of the Council, the Secretary should be authorised to issue at his discretion to newspapers not represented at meetings of the Council, extracts from the reports of divisional committees, after approval by the Council.

Alderman Bates said complaints had been received, but it was not possible for all the local Press to attend. However, they wanted the Press to give the Council the utmost publicity, particularly in outlying areas. Referring to the second part of the resolution, Alderman Bates said he and the Secretary (Mr. D. G. Robinson) would do that.

'We are quite prepared to co-operate,' was the answer given to a communication from the North Midland Regional Board for Industry regarding liaison between the Board and the Council on questions relating to the industrial consumption of gas.

Mr. H. C. Martin, Chairman of the Notts. and Derby Divisional Committee, reported complaints by a number of caterers in Chesterfield regarding the price charged by the Board for gas consumed in connection with their businesses. The caterers suggested that the rate which they should be charged should be that applicable to bakers and fish friers and not the domestic rate.

Mr. Martin said a letter from the Board stated that careful consideration had been given to the representations made by these consumers, and that an examination had been made of the effect on the revenues of the Chesterfield undertaking if the concessions asked for were granted. The Board stated that the effect on the revenues was such that the Board could not accede to the request of the consumers at the present time. Progress was being made with the review of tariff structures generally and the matter would be borne in mind.

Mr. Martin said that prior to revision of tariffs these consumers paid 5.75d. per therm. With revisions the fish friers paid 6.5d., whereas the caterers came up on a sliding scale to 8.5d., and as some did more fish frying than did some fish friers they felt they had cause for complaint. He instanced a caterer's bill for gas for one quarter before revision as being £95 15s. 8d. After revisions, and using about the same amount of gas, the bill was £139 5s. 7d. 'I want to submit we are not to consider the crippling effect on the Board, but to see if they have a case and if so to take the matter up.'

The Council resolved to ask the Board to given the whole matter further consideration.

In the minutes of the Sheffield and Rotherham Divisional Committee, it was stated that Mr. A. Haslam Wood (Barnsley) had reported that, in order to reduce the consumption of gas, his company had decided to heat its factory by using waste heat, and the company had been advised that the result would be a saving of 16% in gas consumption. He stated that delay in implementing the scheme had arisen owing to the long de-

Mr. Philip Noel-Baker, Minister of Fuel and Power, and M.P. for Derby South (right) attending his first gas consultative council meeting at Derby on January 2. With him are Alderman C. R. Bates (Chairman of the East Midlands Council) in the centre, and Mr. D. G. Robinson (Secretary)

livery date for a boiler required and he wondered whether, in view of the urgent need for economy in the use of gas, the Board would be in a position to assist the company in obtaining priority delivery of the boiler.

Mr. H. F. H. Jones, Chairman of the East Midlands Gas Board, said it was difficult to see what they could do.

'What Mr. Haslam Wood wants is the support of the Board and the Board of Trade,' said Alderman Bates.

Mr. Noel-Baker said he was very much in agreement with this most desirable scheme, but the problem was the effect of fuel-cuts on the manufacture of such boilers.

On the advice of the Chairman, it was decided to supply copies of the correspondence which had taken place in the matter to the Minister for his observations.

The Council passed the minutes of the Notts. and Derby Divisional Committee after a considerable discussion about street lighting in Chesterfield, in which Mr. Martin unsuccessfully moved that the reply of the Gas Board explaining the poor lighting in the town be not accepted.

Before the meeting started members stood in silence to mark the recent death of one of its members, Alderman E. Lester, of Loughborough. Two new members were announced—namely, Councillor F. Perry (Doncaster) and Councillor G. H. Clarke (Wolverton).

Chemical Engineers' Convention

A convention on 'Chemical Engineers —Opportunities in Specific Industries,' arranged by the Graduates and Students' Section of the Institution of Chemical Engineers, will be held at Nutford House, Brown Street, London, W.1, on April 11-15.

While the theme of the convention is a general one, each of the seven lectures will relate to conditions in a specific industry and will be given by a senior chemical engineer or other recognised authority. The series will show graduate members the way in which their work and problems reappear in modified forms and are variously solved in other industries. For student members the convention affords a means of assessing where their future interests might lie and the type of work which would be required of them.

Mr. R. F. Twist, Works Manager of the South Eastern Gas Board's tar works, will deal with the gas industry, and Dr. M. Ruhemann, who is directing work on the design of low temperature plant for Petrocarbon, Ltd., will lecture on the low temperature industries.

The 11 works visits during the convention will include visits to the East Greenwich works of the South Eastern Gas Board, British Oxygen Co., Ltd. (Wembley), G. A. Harvey & Co. (London), Ltd. (Greenwich), Lafarge Aluminous Cement Co, Ltd. (West Thurrock), Mond Nickel Co., Ltd. (Acton), and the 'Shell' Refining and Marketing Co., Ltd. (Shellhaven).

MORE CONVERSION VALUES

THE Minister of Fuel and Power has declared by Order that the values of the following securities have been determined under Part II of the Act, the conversion date being January 8, on which date the securities were extinguished and the holders became instead holders of British Gas 3% Guaranteed Stock, 1990-1995, calculated in accordance with the rates mentioned.

Where payments of interest made on or before November 1, 1950, by the Gas Council under direction of the Minister are not sufficient to discharge the interest due for the three successive six-monthly interest periods ended October 31, 1950, the Gas Council will, on or about March 1, make good the deficiency by paying to holders of the securities as at September 26, 1949, March 27, 1950, and September 25, 1950, any balance due for the first, second and third periods respectively. The fourth six months' interest will be paid on the British Gas Stock on May 1.

The usual procedure regarding transfers, the exchange of certificates, etc., will apply on and from the conversion date to holdings of British Gas Stock issued in exchange for the old securities.

Unit values of the old securities are shown in brackets:—

Company	Compensation Value
Aberlady & Gullane Ord. Shares (£5)	£10
Amble & Warkworth 4½% Mort. Deb. Loan (£100)	£100/10/–
Cowdenbeath Ord. Shares (£1) ...	62/6
Do. Ord. Shs. (£1 Shs., 12/- paid)	37/6
Do. Ord. Shs. (£1 Shs., 5/- paid)	15/7½
Dalkeith Ord. Shares (£1)	50/–
Gorebridge Ord. Shares (£1) ...	120/–
Haddington Ord. Stock (£1)... ...	44/–
Hawick 4% Red. Debs. (£100) ...	£100/10/–
Loanhead Ord. Shares (£1)	28/–
Penicuik & District Ord. Shares (10/–)	33/4
Prestonpans & District Ord. Shares (£1)	57/–
Sandy 4% Red. Debs. (£100) ...	£100
Do. 4% Red. Debs. (1950) (£100)	£100
Swindon 3½% Red. Mort. Deb. Stock (1969) (£100)	£100
Tideswell 4% Red. Debs. (£100) ...	£100
Tranent Ord. Shares (£1)	120/–
Wadebridge 5½% Red. Debs. (£50)...	£50/10/–

The liquidator of the South Midland Gas Corporation announces that he is now in a position to repay the 4½% preference shares of £1 each with accrued dividend, and to make a first distribution of £1 per share on the Ordinary shares of £1 each.

We have received a copy of the East Midlands Gas Board *Year Book and Diary, 1951.* It is a useful pocket-size publication giving statistics and full lists of personnel for the area, divisions, and sub-divisions, and officials in charge of the individual undertakings. There is also a list of the members of the East Midlands Gas Consultative Council and its district committees. The diary section includes the dates appointed for Board and Council meetings, and meetings of Gas Council committees, Joint Industrial Council and Joint Council for Gas Staffs, divisional engineers, general managers, etc. Latest statistics show that the Board serves 1,065,100 consumers and sold 47,000 mill. cu.ft. of gas in the last financial year.

A continued high standard of papers and discussion is revealed in the Australian Gas Institute *Transactions* for 1949 recently to hand. In addition to the Presidential Address of Mr. E. S. Finlason and the paper on electrical competition by Mr. A. J. Brown, to which reference has already been made in the *Journal*, the annual general meeting and conference at Melbourne and the meetings of the Northern and Southern Sections discussed a wide range of subjects during the year, including methods of dealing with consumers' complaints, control of calorific value, distribution practices, water heating, and tariffs. Gas sales in Australia increased by 68% between 1939 and 1948.

A Christmas tree in the Newport (Mon.) showrooms, on which the public were invited to place gifts, provided 300 presents for children in the local hospital. Here the Mayor of Newport (Coun. A. E. Wills) accompanied by the Mayoress and Mr. Peter Freeman, M.P. for the constituency, are seen handing their gifts to Mr. J. F. Rust, Engineer and General Manager. The Chairman of the Wales Gas Board (Mr. T. Mervyn Jones) also sent a gift.

Public Relations*

By STANLEY HOPKINSON,
Public Relations Officer, Liverpool Group, North Western Gas Board.

BEFORE any organisation can effectively sell itself to the public, it must first put its own house in order. In the gas industry it is a paramount necessity that every individual employee should understand the value of courteous service, and, of course, no employee will be a courteous servant unless he has absorbed an *esprit de corps* from his employers. To put it more finely, the state of confidence between master and man will largely determine the relations between a public servant and the public. To procure such an understanding calls for much experience, a vast knowledge of an industry or trade in all its phases, and sound experience of humanity.

Public relations is not altogether the sighing for a Utopian existence; it has a hard and practical side. It must get results. There are several types of P.R.O.'s., but the four main groups consist of Government and local government; trading organisation; trade organisations; and cultural bodies.

To Interpret Policy

A public relations officer to a Government department deals mainly with policy, and does not actually sell or promote anything. His job appears to be to interpret the department's policy, and see that news and policy changes reach the public. From time to time the Press complains about Government departments, and I heard from a famous editor the other day, that the type of Press conference held by Government departments frequently resulted in editorial space for which, in other days, they would have had to pay. This, I think, may have been the crux of the Press campaign against public relations officers which appeared some time ago. But there is not the slightest doubt that a well-administered public relations department, acting for a Government department, does a real job of work and is of great assistance to the Press; and I think that today such help is acknowledged.

For instance, the success of Lord Woolton's Ministry of Food was probably made possible by the adroit handling of the public by his public relations officer. In those days the public was always informed in advance of policy changes which affected them, and the conviction that something was wrong was never allowed to grow. In fact, the Ministry propaganda gave the impression that the Minister was taking the public into his confidence. As a contrast, the 'Carry Your Gas Mask' campaign was more or less a failure and brought into sharp relief the important point that it is not possible to persuade the British public to do something that it does not like to do.

In *Public Service and Administration* I find the following reference to public relations officers in local government administration: 'The terms public relations officer and information officer appear to be synonymous, and this points to one of the many differences between the local government P.R.O. and his opposite number in Government departments. There is far more needed than high-grade professional journalism, for as well as arranging exhibitions, conferences, etc., the P.R.O.'s are expected to answer a great variety of questions, many outside the scope of the Town Hall activities. There is, in fact, much to be said in favour of calling this multi-purpose individual an information officer rather than a public relations officer.'

I find myself in agreement with the writer who was commenting on a P.E.P. report that a P.R.O. as such can only act fully where he is employed in a comprehensive capacity.

The P.R.O. to a trading concern has a very big job. Before he can begin publicly to relate his trade he must know very nearly all about it. There seems to be a case here for recruitment for this job from existing personnel, with the proviso that the selected person should undergo training to the standard of the Diploma in Advertising awarded by the Advertising Association, and where possible secure a Diploma in Management.

Now what does the P.R.O. do? First, he maintains cordial and consistent relations with the Press. He gives (or should be able to give) the Press an answer to any inquiry about his business. He should treat reporters as if they were human beings, and he should keep in touch with everything that happens in or to his firm—so that he can often tell the Press something before they enquire. He should not be upset if the newspapers do not publish everything he sends them, because the final judge of news is the editor, and newspapers are smaller nowadays.

The P.R.O. must always be on the watch for interesting Press photographs —those with people on them rather than photographs of scenic beauty, but the latter are not altogether ruled out.

The P.R.O. may also be the contact man (almost the firm's travelling shop window), and if he knows his firm's business he can probably do good advance business for them. I should say that it is vitally important that the P.R.O. should know everybody who is likely to be a business contact on a large basis, and his firm should give him a free hand. The contact side of the job is probably the most important. It is not a selling job in the ordinary sense of the word, but rather the finding out for the salesmen of possible lucrative avenues for business.

Next, the P.R.O. should be able to talk about his own business, and should also be able to write the speeches of busy chief executives. There are lectures to be given to the cultural bodies connected with the business and, if it is a semi-public business, material to be furnished for debates and for outside bodies.

Advertising should, of course, be controlled by the P.R.O., and nowadays this tends to be the case. Here we have the whole armoury of publicity—Press, posters, direct mail, sales material, exhibitions, display, showcards, films, and broadcasting.

The trade organisation is similar in idea to the trading organisation but works from a less personal angle. Examples are the Tea Bureau, the Timber Development Association, Federation of British Industries, etc. Their job is to sell an idea or a series of ideas rather than somebody's goods.

Finally there are the numerous cultural bodies, trade protection societies, and trade unions. These latter have the art of human relations in no small degree. Consciously or unconsciously they have achieved public relations on the grandest scale and are a model for the rest of organised labour throughout the world. This is not political—it is a statement of fact—and the disruptive elements which lately have forced themselves into the limelight have served to show to a marked degree the solidarity of human relations within the trade union movement.

Summing up, I should say that public relations is not an exact science, and any attempt I have made to define it should be considered flexibly. It may be that the methods and mechanics touched upon are such that they show themselevs to be 'out of court' in some instances.

Divorced from Publicity?

From time to time, I have heard the theory advanced that public relations should be divorced from publicity. I do not subscribe to such a doctrine. Imagine a large concern with a P.R.O. and a publicity officer of equal status answering separately for their departments. An untimely advertising scheme might play havoc with a carefully planned educational scheme, and would it be seriously suggested that there should be two sets of Press officers—market research and editorial writers?

I believe that the first organised attempt at collective trade public relations was introduced in 1912 by Sir Francis Goodenough when he founded the British Commercial Gas Association. That Association was the means of really awakening the industry to its responsibility to the public. It was followed by other organisations formed for the purpose of handling legal and industrial relations and general management policy, and finally emerged as the British Gas Council.

The work of this body set up voluntarily by gas undertakings throughout the British Isles is known all over the world, because its policy recognised its affiliation with everyday problems. One writer wrote the other day that 'You have gas making its . . . jump from the 19th century into the 20th by associating itself with slum clearance, town planning, local government, and domestic happiness,' and from now on it will strive to educate the public to use smokeless fuel. If it succeeds in arousing public awareness of the dirt, disease, and cost to the nation of the burning of raw bituminous coal, it will perform another service to mankind, and this is good 'public relations.'

* An Address to the St. Helens Rotary Club.

THE JONES GAS-MAKING PROCESS*

By C. L. TAYLOR,

Station Engineer, Cheltenham Unit, South Western Gas Board.

THE Jones process consists of plant for the gasification of liquid hydrocarbons without the aid of any type of solid fuel. When gasifying petroleum-based fuels the resultant gas is termed 'oil-gas' and in the case of coal-based fuels 'tar-gas,' 'pitch-gas,' and so on. The process must not, therefore, be confused with the use of a light petroleum oil to carburet a base gas made from solid fuel as is the case in carburetted water gas practice.

In the early part of the present century the production of petroleum in California, U.S.A., reached gigantic proportions, consequently it was a very cheap fuel, and the use of any other raw material for gas-making purposes was uneconomic. The Jones process originated in California as a result of these circumstances, and was pioneered by the late Mr. E. C. Jones. Although the early type of plant was very crude, many towns in the western part of the United States were supplied solely with 'oil-gas' produced by Jones plants.

Several plants of 5 mill. cu.ft. per day capacity were erected, the yield of gas being about 23,000 cu.ft. of over 600 B.Th.U. per cu.ft. per ton of oil gasified. The overall efficiency of the process was low but this was counteracted by the low price of the sludge oil used.

The phenomenal development in the use of petroleum and its products in commerce and industry resulted in greatly enhanced prices, and to keep pace with this advancement, the development of the Jones process became an urgent necessity. This work was undertaken by the late Mr. Leon B. Jones, son of Mr. E. C. Jones, and although very few oil-gas plants are in operation today many patents still exist as a tribute to his achievements.

The use of oil-gas for town purposes in the U.S.A. has now been largely superseded by natural gas. A limited number of oil-gas plants, not necessarily to the Jones design, are still utilised as peak load plants, but the general trend is towards water gas carburetted with heavy fuel oil. The petroleum industry is still faced with the difficulty of disposal of the heavier fractions and it is anticipated that the price differential between the light and heavy fractions of refining will be accentuated in the future.

All oil-gas plants are cyclical in operation, whereby oil is burnt in a current of air to heat the refractory bricks, set checkerwise, in the generating vessel, followed by a period of gas-making when steam and oil only are used.

As the cracking or conversion of the volatile content of the oil to gas proceeds by contact with the heated refractories, a portion of the fixed carbon remains, but unlike the coke following the carbonisation of coal, carbon from oil is light and flocculent and passes from the generating vessel suspended in the gas stream. In the early plants this residual carbon amounted to 9 cwt. per ton of oil gasified, and although theoretically a perfect fuel it caused many difficulties. The unfixed condition of the oil in the gas made dry purification practically impossible, liquid purification being resorted to. To overcome the latter problem, Mr. L. B. Jones designed and patented the twin shell and single shell divided generators whereby the oil is injected into one chamber and the resultant gas travels through a second heated chamber for superheating purposes, similarly to carburetted water gas practice.

While this design of plant to a very large extent prevented subsequent condensation of the oil from the gas, the quantity of carbon produced remained substantially the same. Special grates for steam boilers were designed to burn the carbon and at least two plants were installed to briquette the material, but the integral high water content of the carbon as collected still made disposal a difficult problem.

Experimentation was then commenced on an auxiliary vessel, later known as a filter producer, whereby the carbon suspended in the high temperature gas stream was collected on a rotating grate, the filtering medium being hard burnt refractory balls. During the period of re-heating the checkers of the generating vessel, a controlled quantity of air was admitted below the carbon bed and passing upwards formed producer gas. The hot producer gas was conducted to the generator to assist with the re-heating for subsequent oil gasification, thus reducing the amount of oil required for the purpose. As the carbon burns freely in air, the bed in the filter producer attained a very high temperature, and during the gas-making phase steam was admitted to the bed to form blue water gas.

The addition of the filter producers materially increased the efficiency of the process while carbon production was reduced by approximately 50%.

The largest commercial plant with filter producers was installed for the Honolulu Gas Company in 1936. The only operational data available relates to 1936 when the plant worked for only 40% of the possible time. The results were as follows:—

Oil carbonised (tons)	11,340
Gas produced (1,000 cu.ft.)	587,000
Calorific value (B.Th.U.)	519
Gas produced per ton of oil (cu.ft.)	51,750
Gas produced per ton of oil (therms) ...	268
Carbon produced (tons)	2,783
Carbon produced per ton of oil used (cwt.) ...	4.85

Average Analysis of Gas Produced:—

	% by volume.		% by volume.
CO_2	3.2	H_2	49.8
C_6H_6	1.1	CH_4	22.8
C_nH_m	2.2	N_2	4.8
O_2	0.6	C.V. ...	519 B.Th.U.
CO	15.5	Sp. Gr.	0.4638

In 1936, the late Mr. G. M. Gill, Managing Director of the Severn Valley Gas Corporation, during a visit to the United States inspected many of the oil-gas plants which existed at that time and realised the potentialities of this type of process for peak load gas production and its possible use to produce gas from crude tar which at that time was a drug on the market.

Late in the same year, arrangements were concluded for the Newport Gas Company, a subsidiary of the Severn Valley Gas Corporation, to take their full gas requirements in coke oven gas and it was decided to erect an oil-gas plant to act as standby, it being considered that the standby gas should be of the same composition, specific gravity, and general characteristics as the coke oven gas to be supplied. Oil-gas was, therefore, the only gas which answered these requirements.

Mr. L. B. Jones was invited to this country to design the plant and the British company of Jones Gas Process was formed.

British Plants

The Newport plant was designed for a daily output of 2,500,000 cu.ft. of 500 B.Th.U. gas when gasifying light fuel oil, and erection was completed in 1939, but, as the duty of the plant suggests, very little continuous operation transpired.

To reduce capital expenditure to a minimum, many of the later refinements were omitted and the resultant plant was similar in design to the early Jones plants. While the rated capacity of the plant was obtained during the initial trials,

* From a paper to the Western Junior Gas Association, December 9, 1950

during subsequent operation considerable difficulty was experienced due to oil being condensed from the gas in the oxide purifiers.

The generating vessel was of the straight shot type whereby the oil, externally vaporised with steam, was injected into the top of the generator and the resultant oil-gas was discharged at the base. Under normal operation great difficulty was experienced in controlling the temperature in the base of the generator, also in disposing of the colossal quantity of residual carbon produced.

Following completion of the Newport plant it was decided to install a plant at one of the small subsidiary companies of the Severn Valley Gas Corporation, but adapted to gasify crude tar instead of fuel oil should this be found practicable. The plant was duly erected at Stourport-on-Severn and was completed in 1940 after many difficulties arising out of war conditions. The capacity of the plant was 165,000 cu.ft. of gas per day when gasifying light fuel oil, the design being similar in all respects to the Honolulu plant—that is to say, the reaction and regenerating chambers were incorporated within a single mild steel shell, with external filter producers.

Following a short trial period of operation on light fuel oil, the changeover was made to the tar normally produced in the continuous vertical retort installation at this particular works.

Primarily the plant was installed for peak load purposes and to assist production during periods when the vertical retorts were under repair, but with the increased demand for gas it became part of the base load plant and operated for a few hours each day.

The results obtained for the month of September, 1940, were as follows:—

Total tar used (gals.)	5,927
Total hours of operation	191.24
Average hours of operation per day	6.8
Average gas produced (cu.ft.)	798,303
Average calorific value (B.Th.U.)	399
Tar used per 1,000 cu.ft. (gals.)	7.4
Therms per gal. of tar	0.537
Therms per ton of tar (approx.)	107.7

Carbon produced per ton of tar used 5 cwt. approx. (dry basis) Tar Gas Analysis.

	%		%
CO_2	3.7	CH_4	15.1
O_2	0.1	H_2	57.8
C_nH_m	1.2	N_2	10.3
CO	11.8		

The usual initial difficulties experienced in starting up an entirely new process were encountered, but such difficulties were chiefly confined to the mechanical operation of the plant. Although plants previously erected had been operated by hydraulic power at pressures of about 100 lb. per sq. in., this was the first plant to utilise hydraulic power at pressures of 1,000 lb. per sq. in.

The greater free carbon content of the crude tar resulted in an increased production of residual carbon, this being even more noticeable when tar from horizontal retort installations was gasified. The additional carbon deposited on the grates of the filter producers also proved troublesome. The grates seized and created high pressure in the generator when gas-making, but in spite of these difficulties the plant operated with a reasonable amount of success and provided substantial quantities of gas during the difficult war years. The current position with this plant is unknown to the author.

In 1941-42 three plants were erected, each with a rated capacity of 1 mill. cu.ft. of gas per day when using fuel oil. These plants were similar in design and were to the order of the Cheltenham and District Gas Company, the Gloucester Gaslight Company, and the Swindon United Gas Company. They were installed primarily for peak load and standby duty.

As in the case of the Stourport plant it was originally intended that crude tar should be the raw material, but with the introduction of the wartime Coal Tar Control Order this was not permitted, and, as petroleum fuels were unobtainable, alternative coal-based fuel had to be used.

When the Cheltenham plant went into operation in January, 1942, it was decided to use as the fuel an 80/20 pitch/creosote mixture, but the refractories broke down very rapidly and a change was made to soft pitch. When gasifying this fuel, the capacity of the plants was reduced to 450,000-500,000 cu.ft. of 305 B.Th.U. gas per day, and the quantity of carbon produced, on a dry basis, was 11 cwt. per ton of soft pitch used. Although various means for disposal of the carbon were tried, no successful method was found, and it will be appreciated that the plants were soon in trouble from this source and from the large volume of dense smoke emitted during the heating period.

Carbon Recovery Plant

Following completion of the Swindon plant in 1942, some thought was given to the collection of the entrained carbon from the gas stream in a dry condition, and to this end Messrs. W. C. Holmes & Co., Ltd., designed a small-scale electrical precipitator. The results were encouraging and an order was placed for a commercial size plant. The plant was duly erected, but proved unsatisfactory and it was eventually dismantled.

Meanwhile, the possibility of recovering the carbon dry by cyclone had also been considered, and although leading manufacturers of this type of plant had disapproved the idea owing to the fine particle size of the carbon and the high temperature of the gas, Mr. L. B. Jones decided to experiment. A secondhand cyclone was obtained and lined with firebricks to give the estimated internal dimensions. When put into commission in 1943 this cyclone had a recovery efficiency of 40 to 45%, but as the process has two generators it will be realised that only 50% of the gas was being treated.

The Anchor Chemical Company, Manchester, was invited to submit the recovered carbon to the rubber and paint trades, and it was generally accepted as a good filling medium in the compounding of rubber.

It is to be regretted that Mr. Leon B. Jones died suddenly in January, 1943, and was thus prevented from witnessing the first discharge of carbon recovered dry from the process, which has subsequently proved to be virtually the start of a new minor industry in this country—that of carbon black production.

The methods of handling the dry carbon black recovered in this initial cyclone were extremely crude, the hot carbon being discharged into a Redler conveyor, whence it was delivered into steel drums, sealed, and allowed to cool prior to sale.

The second primary cyclone was designed and duly installed to deal with the gas and carbon from the other generator and with the increased production of carbon, it was obvious such methods of handling were unsatisfactory, especially as complaints were continually being received of contamination from metallic scale from the drums.

A Major Alteration

In 1944 a major alteration was made to the Gloucester plant and later to the Cheltenham and Swindon plants.

A secondary cyclone was installed with dual inlets connected to the outlets of the primary cyclones. The conical valves in the wash-box were removed and a single inlet fitted, the valves being replaced by hot gas isolating valves fitted in the generator offtakes. An additional open type vessel with a multiplicity of water sprays was erected on to the existing wash-box to provide extra cooling and washing of the gas. The carbon collecting hoppers beneath the cyclones were improved by fitting internal gastight valves, with rotary extractors for withdrawing the carbon continuously from the hoppers. The extractors were arranged to discharge into water-jacketted, ribbon type spiral screw conveyors wherein the carbon is cooled and elevated to a Gardner rotary brush type sifting machine, whence the carbon is discharged to a storage hopper. Fitted to the hopper discharge is a semi-automatic weighing machine. The carbon is packed in 50 lb. 4-ply paper sacks, the sacks being closed on a stitching machine.

The successful recovery and marketing of the dry carbon tended to change the emphasis of the Jones process in this country from a gas-making process to a carbon black process, and naturally all efforts were directed to increasing the amount of carbon available for recovery. Attention was, therefore, given to an improvement in the design of the fuel sprayers, and following a great deal of experiment it was found possible to re-design the fuel sprayers to give a fine mist spray. As a consequence, the amount of carbon deposited on the reaction chamber checkers is insufficient to support the production of blue water gas and a greater quantity of fuel is required for re-heating.

Approximately 66% of the available carbon is recovered in dry form and experiment has proceeded with various types of cyclone to improve the recovery efficiency but, it will be appreciated that as the concentration of the carbon in the gas stream is reduced, recovery becomes increasingly difficult. Conventional and unconventional types of recovery plant have proved unsuccessful, generally due to the high temperature of the gas and the presence of large quantities of undecomposed steam. However, third stage cyclone has now been developed and incorporated on the Gloucester plant which has increased recovery of the carbon in dry form to 85%-90%.

Fuel Used

The soft pitch used on the process was the residue remaining from the distillation of crude tar to 265°C., softening point (K & S) 36°C., but in addition 80/20 pitch/creosite mixture, pitch/anthracene mixture, Phurnacite crude tar, gas oil, and heavy fuel oil have been used for varying periods.

From the use of these fuels evidence has been obtained that it is the process which defines the grade of carbon black produced and not the fuel. The blacks produced from the various fuels were interchangeable one with another.

Heavy fuel oil has given the best overall results both as regards gas and carbon production, also ease of operation, and it has now been finally decided to standardise on this fuel. The heavy fuel oil at present in use is obtained from the Middle East oilfields and is not ideal for process, but is the best that can be obtained. The ash deposited on the checkers during the heating phase contains a high percentage of vanadium oxide which is very detrimental to the refractories, and although silicon carbide refractories have proved resistant to attack, their cost is prohibitive. A further disadvantage is the high sulphur content of the oil which is reflected in the H_2S content of the oil-gas and as sulphur in the carbon black.

Results obtained from heavy fuel oil are as follows:—

Results from Heavy Fuel Oil

Period Feb. 9, 1948, to Mar. 14, 1950 (with primary and secondary cyclones).

Heavy oil used (tons)	9,866
Gas produced (cu.ft.)	476,471,000
Gas produced (therms)	1,670,962
Average calorific value of gas (B.Th.U.)	351
Therms per ton of total heavy oil used	169
Total dry carbon produced (tons)	3,126
Dry carbon recovered as % of fuel used	31.7

Period June 16, 1950, to Aug. 27, 1950 (with primary, secondary, and single third stage cyclones).

Heavy oil used (tons)	876
Gas produced (cu.ft.)	36,597,000
Gas produced (therms)	133,727
Average calorific value of gas (B.Th.U.)	365
Therms per ton of total heavy oil used	153
Total dry carbon produced (tons)	338.5
Dry carbon recovered as % of fuel used	38.6

Note.—The total carbon available for recovery per ton of heavy fuel oil used averages 9 cwt.; therefore the recovery efficiency for the three stages of cyclones is 88%.

Although operating technique has been directed towards the production of dry carbon black, the yield of oil-gas is quite substantial as will be observed from the results obtained on the Gloucester plant for the four weeks ended Sept. 24, 1950.

Gas made (1,000 cu.ft.)	20,337
Calorific value (B.Th.U.)	364
Therms of gas made	74,110
Average hours of operation per day	21.4
Total heavy fuel oil used (tons)	472.644
Therms of gas per ton of total oil used	156.7
Total dry carbon made (tons)	181.15
Lb. of dry carbon recovered per lb. of total oil used	0.383

Average of oil-gas analyses:—

	% by volume
CO_2	4.6
O_2	0.2
C_nH_m	0.5
CO	7.4
CH_4	12.9
H_2	62.5
N_2 (by diff.)	11.9
Calculated C.V.	363 B.Th.U.
Sp. Gr.	0.381
H_2S	600 grains/100 cu.ft.

The oil-gas is an ideal diluent and its low specific gravity makes it especially suitable for admixture with carburetted water gas.

The calorific value of the gas is not variable, as is the case with carburetted water gas, by increasing the oil throughput. An increase in oil on the Jones plant simply increases the volume of gas produced, the calorific value remaining relatively constant. Under conditions of additional oil increased quantities of carbon are deposited on the reaction chamber checkers and consequently higher operating temperatures are obtained with the resultant increased volume of gas.

Dry Carbon Black

The trade name for the dry carbon is 'Seval' black, and by far the greater portion of production is sold to the home rubber trade, though fairly substantial tonnages have been exported. It is not generally realised that a variety of other ingredients must be incorporated into rubber before it is of service to industry. Rubber itself has low mechanical strength, low resistance to wear, and a tendency to become brittle with age. These disadvantages are overcome by the incorporation of carbon black. There are many kinds and grades of carbon black, some giving wearing power to the rubber, others flexibility without cracking, resistance to heat build up under work, and so on.

'Seval' is a medium thermal black often referred to as soft carbon. Its reinforcing value in rubber is low, but it has the advantage of being easy to process and accordingly it can be highly loaded into the rubber stock. General opinion indicates that there will always be a demand for this type of black, providing its use is economical when compared with other substitutes. Even so, it must be appreciated that the demand for medium thermal black is limited.

The standard for quality of 'Seval' black is given below and this is rigidly enforced by the rubber trade.

Acetone extractable matter	0.35%
Benzene extractable matter	0.36%
Ash	nil
H_2O	0.1%

Residue on 100 mesh I.M.M. sieve. Traces to maximum of 0.01%.

Residue on 200 mesh I.M.M. sieve 0.04%.

Initially great difficulty was experienced in maintaining the standard. Carbon deposited in the gas connections and cyclones became graphitised by the high temperature gas and subsequently became re-entrained in the gas stream and deposited in the cyclones. This was eventually prevented by increasing the velocity of the gases and it is only on very rare occasions that any residue is found on a 100 mesh sieve. For test purposes a small sample is extracted from each bag produced, and, after mixing, the composite sample is tested at the

end of each day by the station's chemical staff and the sales agents of the Anchor Chemical Company.

Metallic contamination of the carbon also gave a great deal of trouble, but this was traced to the breakdown of the metal forming the outlet dip pipes of the cyclones. This contaminant was completely eliminated by the use of heat and corrosion resisting metal.

A great deal of time and money has been spent to find some satisfactory outlet for the carbon paste. As produced it is in the form of a slurry and contains 80% water. After months of air drying the water content is only reduced to 60% and it remains a very difficult material. Research has included the drying by heat treatment to produce a carbon suitable for the rubber trade, but such treatment appears to alter the characteristics of the carbon. It will also be realised that with the shock cooling of the oil-gas in the wash-box condensable volatile matter becomes attached to the carbon which is detrimental in rubber compounding. For other purposes the cost of drying is prohibitive.

A sale for substantial quantities of the carbon containing 60% water has now been obtained for the manufacture of carbon electrodes for the aluminium industry. The material is proving satisfactory, its low ash content being a great advantage, but the revenue obtained is small when compared with that obtained for the dry carbon.

Some useful work on the briquetting of carbon paste with coke breeze was carried out on a Tapping machine at the Hollacombe works of the Torquay Sub-Division of the South Western Gas Board in June, 1950, when it was proved that a reasonably good briquette containing 14% carbon paste, 74% breeze, and 12% pitch could be produced. In view of the subsequent sales to the aluminium industry, this means of disposal was not proceeded with.

Research

The research and engineering departments of the Jones Gas Process Company can rightly claim to have done a good job of work in connection with carbon black production. Every practical chemical engineer will realise the difficulties which exist in endeavouring to carry out experimental work on a full scale plant which must be maintained in full operation to provide a continuous flow of the products, in this instance the oil-gas and the dry carbon.

Current research is naturally centred around increasing the amount of carbon recovered dry. Mist water sprays have been incorporated in the gas offtakes to reduce the temperature and therefore the volume of oil-gas, thus also increasing the carbon burden, but the water so injected must be restricted to avoid turbulence. With present arrangement of plant the incorporation of a special vessel for this purpose would be difficult; the loss of operating time would also be considerable. The possibilities of spraying the carbon paste, with perhaps additional water, into the hot gas stream are also under investigation.

The present design of the selector valve unit does not permit the purging of the generating vessel after each heat portion of the cycle, and it is considered if this were possible the calorific value of the oil-gas would be increased by 15 to 20 B.Th.U.

As will have been observed from the foregoing remarks, the Cheltenham, Gloucester, and Swindon plants were originally designed as gas-making units, and the addition of the carbon recovery plant gives the impression that bits have been tacked on. Virtually this is true, but I am sure if the Jones Gas Process Company decided to design and install a further plant, into which could be incorporated all the knowledge gained over the past 12 years, the result would be an excellent and reliable plant.

It would be impolitic to refer to the economics of the process in this contribution, it can be stated that the income from the sales of 'Seval' carbon are such that the cost of the oil-gas is considerably lower than coal gas or carburetted water gas. As a result and coupled with the need to give continuously regular supplies of 'Seval' the Jones plants are now part of the base-load plant.

It would be discourteous not to make reference to the very valuable work carried out by Messrs. H. Stanier and J. B. McKean, of the South Eastern Gas Board. From their contribution 'The Production of Town Gas by the Catalytic Gasification of Petroleum Oils' given at the 16th Autumn Research Meeting of the Institution of Gas Engineers, it is obvious that the answer to our dream has been found—namely, the gasification of heavy fuel oil without the integral production of carbon and/or tarry matter.

Unforeseen difficulties may arise when the full scale plant is brought into operation, but with experience such difficulties will be overcome. While the authors claim a process for the production of peak load gas, there is every possibility it will become part of the base load plant. Naturally the extent of operation will be governed by the market for heavy fuel oil, but if the anticipated surplus of this grade of oil materialises, then the price differential with refined products must be, at least, maintained and the cost to produce oil-gas by the process should compare very favourably with coal-gas and carburetted water gas.

DISCUSSION

The **President,** Mr. F. W. Sansom (Exeter) congratulated Mr. Taylor on his exposition of an uncommon process. The author had covered most of the points on the operation of the plant, but he (the speaker) had three small queries to make: (1) What difficulties, if any, were encountered on the purification of gases made by the Jones process? (2) The author had mentioned the time taken to attain gas-making temperature from cold with new refractories, and subsequently what was the time taken to raise heats when the plant was in daily use? (3) What was the quantity of oil used per cycle on the Cheltenham installation?

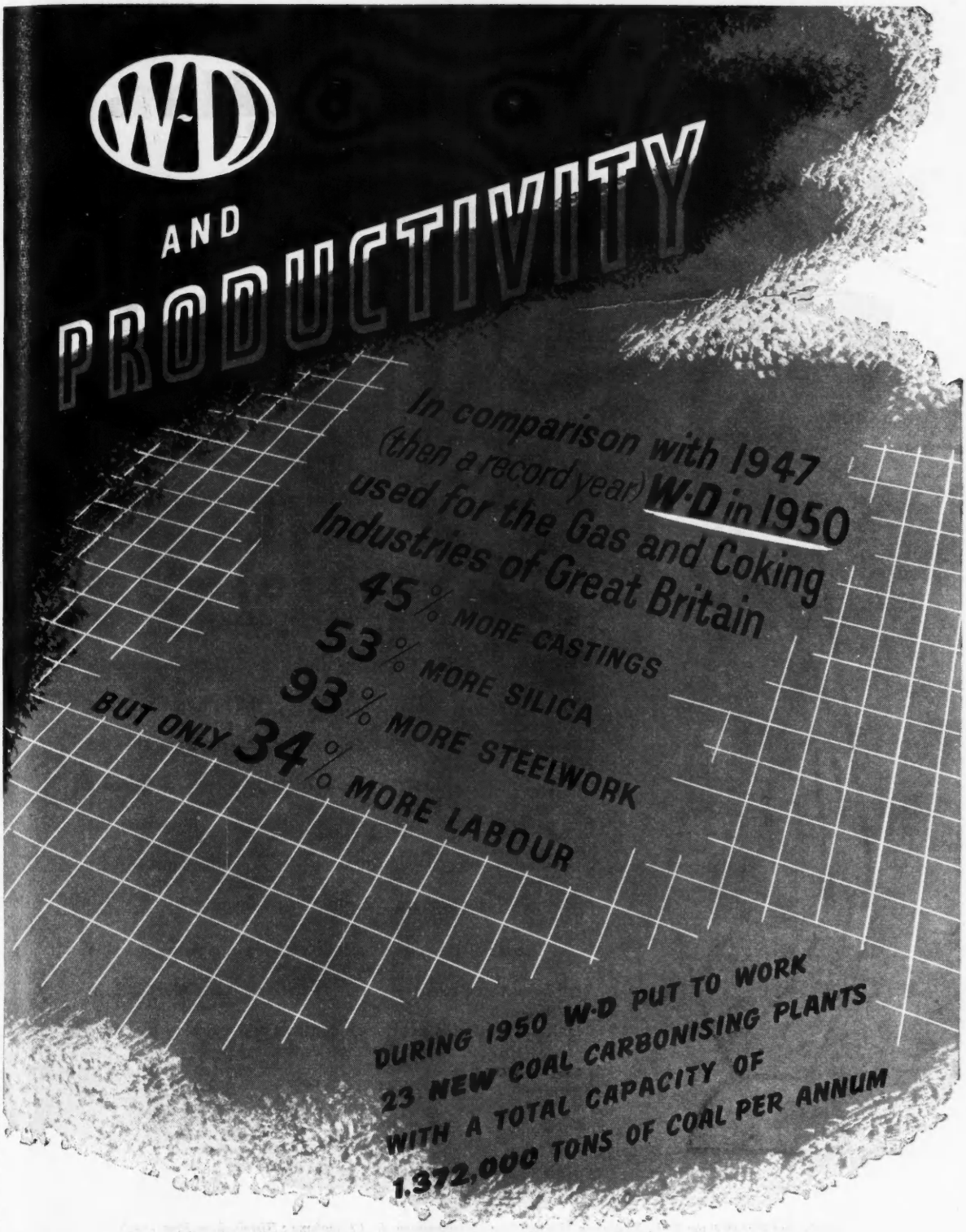
Mr. **J. Foxton** (Cheltenham) referred to the author's mention of the work of Stanier and McKean and commended their tenacity in continuing in spite of the removal of the subsidy on gas oil. He mentioned that at Cheltenham experiments were carried out with the production of oil-gas in horizontal retorts. Gasification of 10 gal. of oil per hour was possible, and on a basis of 1 therm per gal., 240 therms per retort per day were obtained. He suggested that this might be a means of easing the present coke shortage.

Mr. **J. A. Woodcock** (Gloucester) paid tribute to Mr. Taylor's work. He suggested the plant compared very favourably with C.W.G. plant and pointed out that at Gloucester it had been developed as a base load plant. He considered the Jones plant to be very reliable, and it might be advisable to get away from C.W.G. The main characteristic of Jones gas was consistency with an even and regular C.V., but it must be borne in mind that when used as a diluent the gas to which it was added must be of high quality. Some difficulty might be experienced in purification due to the high H_2S content.

Mr. **J. H. Cornish** (Taunton) remarked that the author had suggested that if all the results and modifications obtained in the past 12 years could be incorporated in a newly-designed plant, an excellent and reliable plant would result. He could not understand why such plants were not under construction.

Mr. **A. C. Rae** (Bath) presumed that there must be snags with this type of plant because of the number of plants now out of commission. He understood that the sulphur content of the gas was high and might be a drawback in certain instances. The amount of ground space required by the plant, compared with alternative installations, was high.

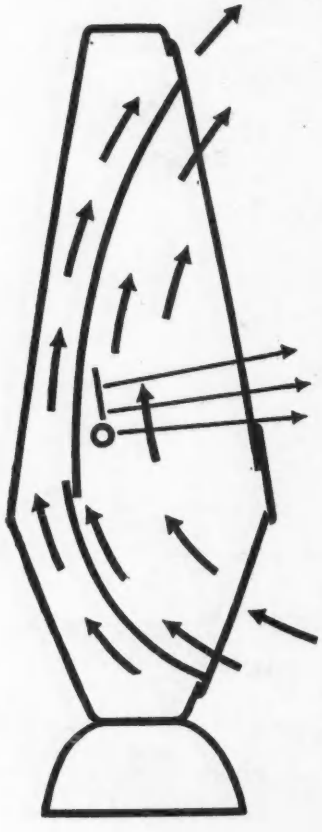
Mr. **Taylor,** in reply, stated that no undue difficulties had been experienced in the past two years and, in fact, a greater proportion of dry carbon was now being recovered, although some trouble had been experienced with suspensions. The quantity of oil was 10 gal. per min. and represented 25 gal. per cycle. When the plant was in daily operation it took about one hour to raise heats to working temperature. He had no doubt that Messrs. Stanier and McKean would finally overcome all the difficulties now experienced. The Jones Process Company had not unlimited capital and this might explain to some extent why new plants were not in course of erection. The process was quite capable of developing in the future until 100% carbon recovery was obtained. He would welcome the erection of another plant as this would enable the incorporation in the design of all modifications which had suggested themselves to him during the past years.


W·D
AND
PRODUCTIVITY
In comparison with 1947
(then a record year) W·D in 1950
used for the Gas and Coking
Industries of Great Britain
45% MORE CASTINGS
53% MORE SILICA
93% MORE STEELWORK
BUT ONLY 34% MORE LABOUR
DURING 1950 W·D PUT TO WORK
23 NEW COAL CARBONISING PLANTS
WITH A TOTAL CAPACITY OF
1,372,000 TONS OF COAL PER ANNUM

THE WOODALL-DUCKHAM VERTICAL RETORT AND OVEN CONSTRUCTION CO. (1920) LTD.
WOODALL-DUCKHAM HOUSE, 63-77 BROMPTON ROAD, LONDON, S.W.3
Members of the Society of British Gas Industries
Telephone: KENsington 6355 (7 lines) Telegrams: Retortical, Southkens, London

Introducing . . .

The NEW WORLD MERLIN



THE NEW WORLD MERLIN—a new flueless heater—is designed for general space heating in any normally ventilated apartment. The standard rating is 8,000 B.Th.U./Hr. input; 90% of the input is emitted as useful heat, much of it being radiant heat.

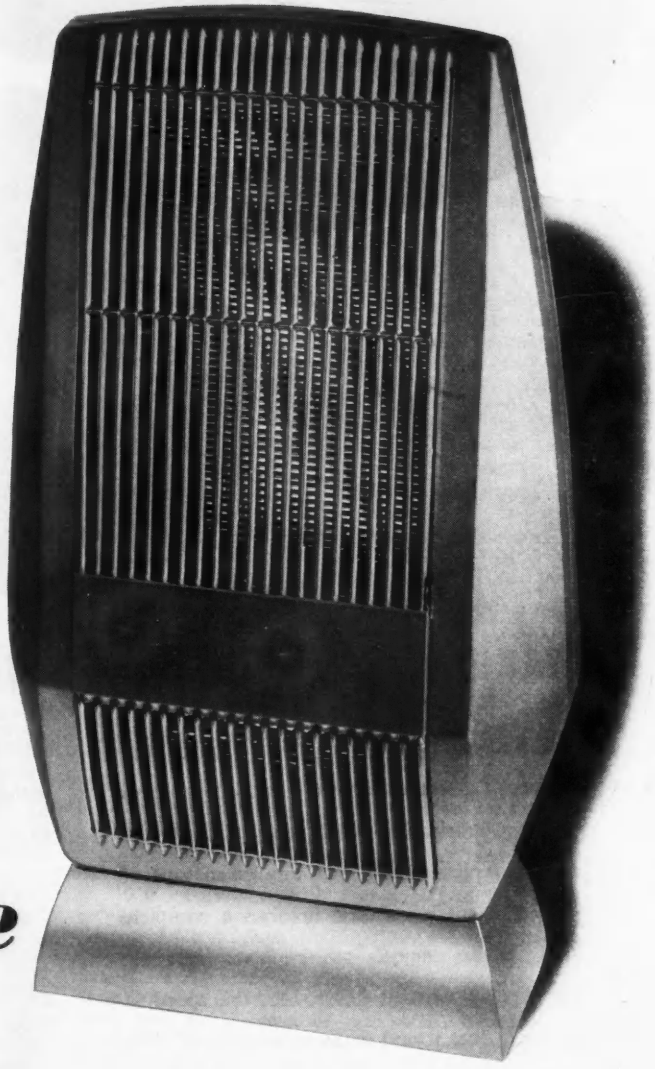
Air, taken in continuously at the base of the appliance, is heated as it rises behind and in front of the reflector and then flows steadily in a forwardly-directed stream from the top (see diagram). Thus the whole room is rapidly raised to a comfortable temperature whilst the attractive glow from the heat-resisting metal element and polished aluminium reflectors adds to the atmosphere of comfortable warmth.

The metal element is heated to a bright, glowing red by a luminous flame burner—governor-controlled and silent. Flash-ignition lighting is provided; controls and working parts are easy of access.

Radiation Group Sales Ltd., Radiation House, Aston, Birmingham, 6 (*Telephone : Birmingham East* 1580)

NEW WORLD NEW WORLD NEW WORLD

a new Gas Space Heater

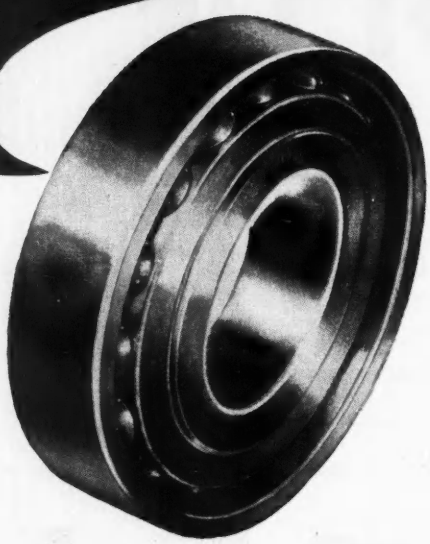


it's a NEW WORLD for me

Showrooms & London Offices: 7 Stratford Place, W.1. *(Telephone: Mayfair 6462)*

NEW WORLD NEW WORLD NEW WORLD

There's more to LUBRICATION than just ... OIL



WAKEFIELD INDUSTRIAL LUBRICATION SERVICE

The Wakefield Industrial Lubrication Service offers you specialised advice on all oil problems. Efficient lubrication is not only a matter of regular replenishment with any given type of oil. Efficient lubrication involves a complete study of an engine's requirements including the type of work it has to do, the speed at which it does it and many other factors. The Wakefield Industrial Lubrication Service is equipped to tackle every sort of oil problem. Wakefield engineers will advise you on the best oil for your purpose and on its method of use —this advice is freely available to all who wish to profit from it.

OIL FOR INDUSTRY

C. C. WAKEFIELD AND COMPANY LIMITED · LONDON · W.1

The Conversion to Gas of

SOLID FUEL CENTRAL HEATING BOILERS*

By W. E. Whitney, M.Inst.Gas E.,
Stockton.

THE well-known disadvantages of solid fuel arising from storage, handling difficulties, and high stoking costs have led to a general increase in the number of users of gas-fired equipment, despite the comparatively high cost of gas. The purpose of this paper is to consider the conversion of existing solid fuel boilers to gas firing, with particular reference to the use of the 'Hypact' burner.

Points to be observed on the Existing Installation:

(1) It is important to check the loading of a boiler before giving consideration to its conversion to gas firing. If it is found to be overloaded the consumer should be advised against conversion on the existing installation and alternative means of heating should be suggested. A solid fuel boiler can carry a considerable overload, a gas-fired boiler cannot. In this connection the consumer should be questioned regarding the effectiveness in severe weather of the existing system. It is advisable to make sure that radiators and piping have not been added since the original installation.

(2) *Insulation.*
The lagging on the boiler and flow and return pipes within the boiler house should be in good condition. Where lagging is faulty the consumer should be advised to remedy this defect, which would reflect on running costs with town gas.

(3) The age of the boiler may be a deciding factor for or against conversion. A conversion unit would not be economically justified on a boiler which was approaching the end of its normal working life.

(4) *Running Costs.*
I find that many potential consumers in the central heating field hold the impression that gas will necessarily be a cheaper fuel than coke, due to its higher efficiency of utilisation. This is not true; therm for therm gas costs twice as much as solid fuel, even taking relative efficiencies into consideration. It is important to dispel any illusions of this order which the consumer may hold, while emphasising the many advantages of gas fuel in other directions. The consumer will often ask for seasonal running costs on a gas installation. In such cases it is usual to calculate the heat losses from the building expressed in B.Th.U. per °F. difference per hour. These are evaluated by the use of heat transfer coefficients for building materials and loss due to air charge. In calculations of this type I use an assumed figure of 65% for boiler efficiency with a conversion set, and generally assume two air changes per hour. In certain buildings it may be necessary to allow for a higher number of air changes. The figure thus obtained for hourly heat loss is then multiplied by the number of 'degree days' for the heating season to give the seasonal heat loss. The cost can then easily be obtained by multiplying the estimated gas consumption by the appropriate gas charge. Tht 'degree day' figures are published by the Gas Council Coke Department and assume a base temperature of 60°F. The average figure for the North-East Coast area is 4,500.

(5) *Existing Flue System.*
Attention should be given to pressure conditions on the existing flue. In many cases the products of combustion from solid fuel boilers discharge into brick flues perhaps running the height of a five-storey building. Where pressure conditions are unsatisfactory it is necessary to fit an independent flue. It is important to ensure that an excess of combustion air is obtained in the boiler house. Where the supply of air to the boiler house is restricted, smothering of the burner flames may occur. In my undertaking we have encountered situations of this type. It is our usual practice to fit a wire mesh grid over an aperture in the boiler house door to ensure an adequate air supply.

(6) A suitable position for the gas meter should be chosen. Owing to fire hazards, it is necessary to locate the meter outside the boiler house. Large capacity meters with flanged connections should be fitted with by-pass controls to allow continuity of gas supply.

Choice of Controls

The main advantage claimed for the conversion unit compared with a new boiler is its comparatively low capital cost. Hence it follows that the adoption of numerous control devices and gadgets tends to nullify the advantages under this head. In practice, a compromise is effected between capital costs, running costs, and fundamental safety precautions. The first two factors are governed by the size of the installation. However, as a guide, the following equipment should be regarded as essential on the larger installations:—

(1) An approved type of baffle. In many cases it will be necessary to use either a 'Shorne' or 'Dwarf' pattern owing to space restrictions. The baffle should be fixed direct to the boiler.

(2) *Flame Failure Device.*
Generally speaking, two simple types are used:—
(a) Thermo-magnetic type.
(b) Low pressure cut-off valve.

On the larger installations the thermo-magnetic valve is preferred. This instrument is small and compact and may be fitted to the relay-valve weep pipe.

The low pressure cut-off may be justified on the grounds of cost when fitted to the smaller boilers.

(3) Constant pressure gas governor of diaphragm type with a main cock located as near as possible to the burner assembly.

In addition, it is advisable to install an immersion thermostat of the bi-metallic rod type with rotating head calibrated to 210°F. Further controls commonly used on this type of installation are room thermostats, air shutter controls, and clock controllers. Such items add considerably to the installation cost and should only be recommended where circumstances are favourable to their adoption. In instances where these controls are fitted with long runs of interconnecting weep tube, the diameter of such tubing should be at least ¼ in. in order that the pressure in the tube may be released as quickly as possible when the control opens.

Installation of Conversion Unit

The boiler firebox and flues must be thoroughly cleaned before commencing work on conversion. The main gas inlet and burner in a conversion installation we recommend pass through a mild steel burner mounting plate which is bolted to the front of the boiler. Care should be taken to avoid air infiltration around the perimeter of the plate; all air for combustion should enter through the air slide provided. This

* From a paper to the Northern Junior Gas Association, December 8, 1950

plate replaces the charging doors normally supplied. The plate and flue covers are insulated with asbestos board to reduce radiation heat losses. An air slide is located in the base of the adaptor plate. A permanent opening is left in the slide so that the minimum air for combustion for pilot and main burners is ensured.

A flap sealed inspection part of generous proportions is also incorporated in the mounting plate. Two rat-tail pilot jets are arranged to fire obliquely along the burner port. With the 'Hypact' burner large volumes of gas issue from one point source and hence two pilots are adopted as an added precaution to ensure speedy ignition. The flame from the burner impinges on broken refractory and is diverted downwards at an angle of about 30°. Sufficient refractory is used in the combustion space adequately to scrub the sensible heat from the products of combustion prior to their discharge to the flueways.

The controls are arranged with flame failure device and water thermostat connected in series to the relay valve weep. The main control cock precedes the governor to facilitate maintenance work.

The permanent pilot supply is arranged with a separate tap located before the main control tap. This supply also feeds the thermo safety device pilot. To facilitate ignition, a lighting torch should be fixed by means of a flex tube to the inlet supply pipe.

It is desirable to operate the boiler with a vacuum in the region of 1/10 in. W.G. on the flue spigot; higher vacuum conditions cause excessive air influx and lowered efficiency. Therefore it is often necessary to arrange a vent in the chimney to reduce the vacuum. The excess air thus admitted also prevents condensation in the flue system.

The 'Hypact' Burner

This burner has been used on conversion units in this area and has given every satisfaction. It may be purchased in sizes ranging from 60 to 2,500 cu.ft./hr. The capacities are based on a 1 in. W.G. pressure and specific gravity of 0.48. The burner is in effect a larger version of the well-known Bray jet. The approach to the burner slot is shaped in such a way that the two streams of gas impinge upon the flame from opposite sides, giving it a characteristic fan shape. This flame has a large surface area and is thus eminently suited for use in boiler installations where combustion has to be carried out in a small space.

The burners are rated at pressures of 1 in. W.G. In practice I have found an operating pressure of 1.5 in. W.G. to be ideal. The higher pressure, of course, increases the delivery capacity of the burner and it is necessary to multiply the rated capacity by the root of the pressure in order to obtain the discharge capacity under higher pressure conditions.

The particular advantages of the burner are as follows:—

(1) Completely silent at pressures up to 0.6 in. W.G.

(2) Stability from 1 cu.ft./hr. to full gas rate.

This feature renders it highly suitable for adaption to thermostatic control.

(3) Low cost, which is a particularly desirable feature in boiler conversion. The burner is very simple in construction and is made by brazing a mild steel plate into one end of a standard socket. The largest size weighs only 4 lb.

(4) The fitting of the burner is a simple process; the burner may be screwed on the end of a standard steel pipe.

Before handing over the installation, care should be taken to advise the consumer on the proper use of all controls and instruments. In my undertaking we have adopted the practice of verbally instructing the consumer and also supplying copies of operating instructions. We recommend that a copy should be hung in the boiler house and stress that escape of gas or other unusual occurrence should be reported to the gasworks without delay.

The potential central heating load throughout the country is considerable. Gas has been in this field for some time by providing a refined fuel for central heating of large premises. Hitherto this has been carried out on a somewhat limited scale. The conversion unit will in many cases establish a bridgehead for gas in the central heating of large buildings. We must bear in mind that a satisfied consumer in this respect will in all probability install a new gas boiler at a future date. Central heating of large buildings constitutes a form of district heating. The general adoption of gas-fired central heating plant will do much to dispel the idea in the mind of the lay citizen that thermal electric schemes have a monopoly in district heating.

DISCUSSION

Mr. **T. R. Wicks** (Workington) asked for further information regarding efficiencies of converted boilers. He thought that an upper figure of 65% was rather high. He would also like details of conversion and running costs, for he felt that in many cases boiler conversions were not economically justified.

Mr. **H. W. Walton** (Newcastle) thought they should avoid undertaking central heating where possible due to its poor load factor. Their experiences in the recent bad weather bore out this statement.

Mr. **Smith** (Middlesbrough) doubted the statement that gas could be adapted to any type of installation. In fact, he had had an unfortunate experience in this respect regarding a small hot water boiler.

Mr. **S. N. P. Nelson** (Hartlepool) remarked that they had recently done a rather unusual job at Hartlepool in the central heating field. It consisted of removing the boiler and utilising the hot water pipes as carcass piping for the supply to gas radiators.

Mr. **G. E. Haddon** (Stockton) commented that, in general, any solid fuel appliance could be converted to gas firing. In regard to the overload capacity of a solid fuel boiler as compared with a gas-fired one, this was an important point when substituting a gas conversion or new gas boiler to existing pipe circuits. With a good draught and good firebed, higher temperatures up to steam at 212° F was common, which permitted a considerable temperature difference as between the rising flow main and the falling return main, which increased the circulation pressure head, with corresponding benefit. As to insulation, all pipes in the boiler house should be heavily lagged—heat was not required there, and that from the boiler was more than sufficient. The flow mains on the heating circuit should be lagged and those on the return not. The greater the temperature difference between the flow and the return pipes the greater the circulation head, and in a gravity system this was small even under the best conditions. The question of running cost should be tackled with the greatest care, as it would be generally accepted that gas for central heating was not cheap and in certain circumstances savoured of luxury heating. Regarding the fitting of a baffle or draught diverter, he would emphasise that this was most important. With an existing flue installation its fitting was sometimes difficult and the temptation must be resisted to leave well alone. Speaking generally, gas central heating had an extremely poor load factor for most undertakings. Exceptions were seaside resorts like Blackpool where the summer holiday periods represented peaks and central heating, being a winter load, presented no problems. Space might usefully have been given to the question of high/low or on/off control. He would mention that with gas central heating for glasshouses, on/off control only should be considered.

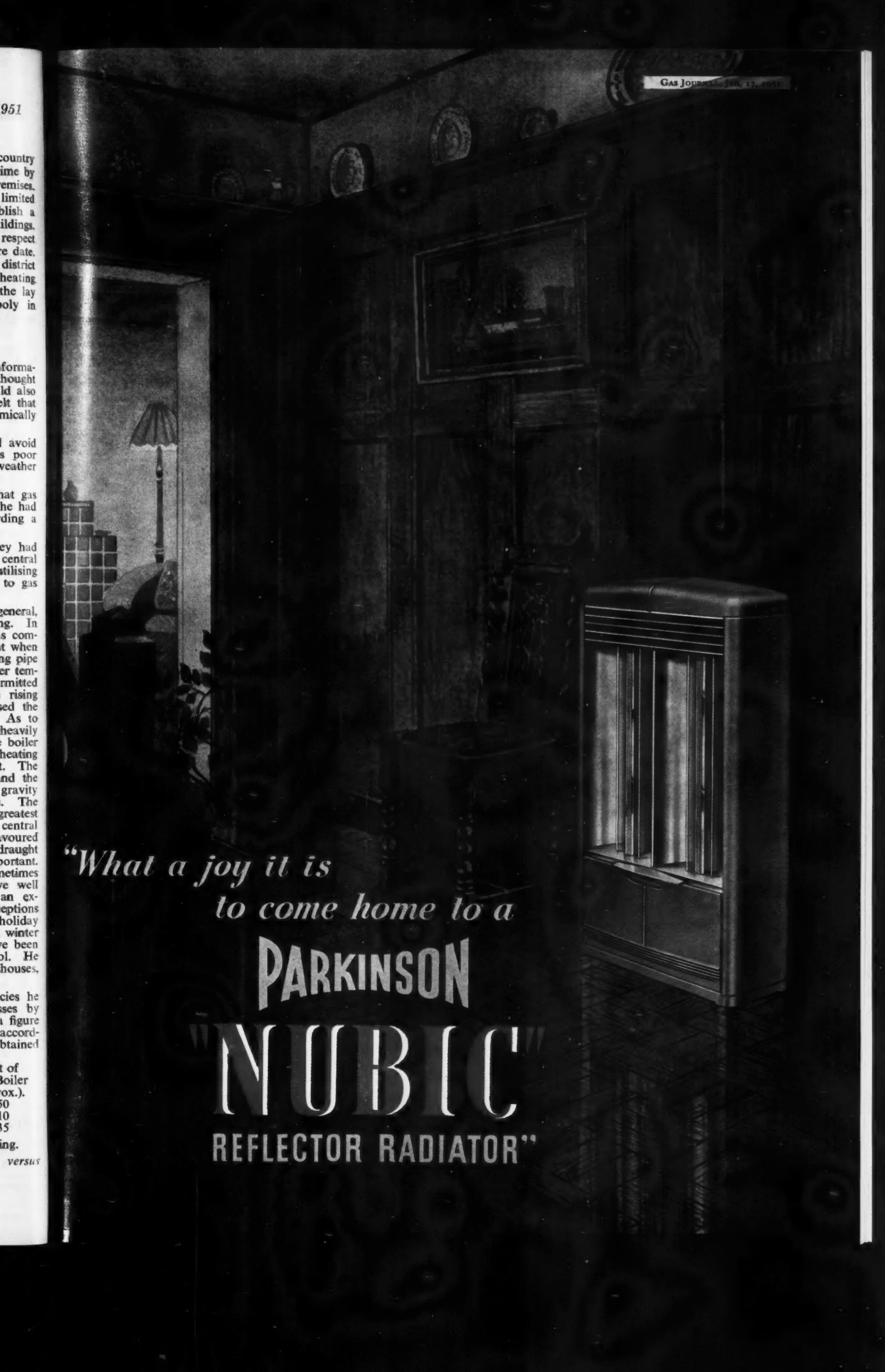
Mr. **Whitney,** in reply, said that the actual efficiencies he had obtained on conversion units, ignoring heat losses by radiation, averaged 70%. In one instance he obtained a figure of 74.5%. The costs of conversion naturally varied according to size and type, but the following figures were obtained in the current season:—

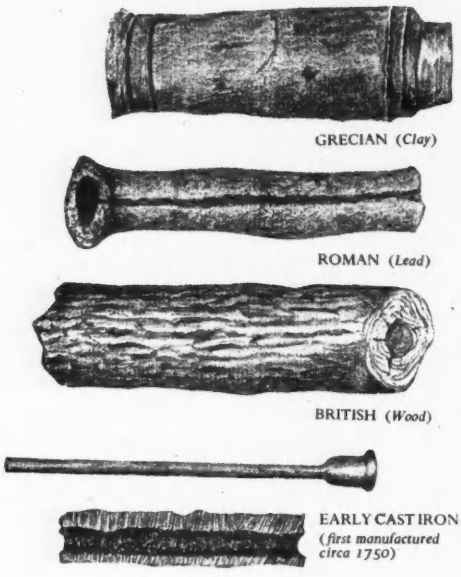
Type of Boiler.	Gas Rate cu.ft./hr.	Cost of Conversion.	*Cost of New Boiler (approx.).
Robin Hood Junior	250	£25	£50
16K Britannia	500	£35	£110
26K Britannia	750	£45	£135

*This figure does not include additional cost of fixing.

In regard to the economics of a converted boiler *versus*

(*Concluded on p. 184*)


"What a joy it is
to come home to a
PARKINSON
"NUBIC"
REFLECTOR RADIATOR"



GRECIAN (*Clay*)

ROMAN (*Lead*)

BRITISH (*Wood*)

EARLY CAST IRON
(*first manufactured circa 1750*)

Pipes in different Ages

FOR many centuries progress was slow in pipe making, and it was only 200 years ago that cast iron came into use for the purpose. Since then the advance in the technique of manufacture and of joint types, together with the introduction of steel, has made possible the laying of mains that remain "bottle tight" under modern traffic conditions, and which render distribution losses negligible.

In the 20th Century

PRESS for MAINLAYING

Cutting 36" C.I. Pipe

[*Photo by courtesy of the North Thames Gas Board*

38 Years' Service to the Gas Industry

WILLIAM PRESS & SON LTD

22, QUEEN ANNE'S GATE, WESTMINSTER, S.W.1. *Telephone: WHitehall 1752-3 & 2961. Telegrams: Unwater, Parl, London*
WILLOUGHBY LANE, TOTTENHAM, N.17. *Telephone: TOTtenham 2665-8. Telegrams: Unwater, Southtot, London*

COMPLETE GASWORKS PLANTS

by Simon-Carves Ltd

SIMON CARVES GROUP

STOCKPORT ENGLAND

For efficient and lasting service...

To burn gas efficiently for the production of hot water, either for domestic purposes or central heating, demands a Boiler specially designed for the purpose. Over a period of 20 years we have developed a series of Boilers, each of which is unequalled in its particular field.

All Boilers are equipped with a complete set of thermostatic controls, and have insulated jackets of steel or aluminium in appropriate finishes. 'Ideal' Gas Boilers are available in 22 sizes from 20,000 to 1,430,000 B.T.U. per hour.

An illustrated booklet giving full details is available on request.

The illustration below shows a No. 1—GBB4 Ideal Gas Boiler installed in a modern kitchen.

IDEAL GAS BOILERS

EFFICIENT · RELIABLE · LABOUR SAVING

IDEAL BOILERS & RADIATORS LTD.

IDEAL-Standard
Foremost for heating and sanitary equipment

IDEAL WORKS, HULL, YORKSHIRE

The Application of Pre-stressed Concrete to Structural and Building Work*

BY

S. V. GARDNER, M.I.Struct.E., A.M.I.C.E.,

Design Engineer (Reinforced Concrete),
North Thames Gas Board.

AS its name implies, pre-stressed concrete is stressed before it is put into use. Furthermore, this stress is arranged to be approximately equal in magnitude and opposite in sign to the tensile stresses induced by the live and dead loads so that the final stress in the concrete can always, and at all sections, be entirely compressive. This condition cannot be achieved, of course, without a considerable increase in the stress in the reinforcement.

Two distinct processes for obtaining the initial pre-stress are in use at the present time, and it is important that their differences should be clearly understood. These methods may conveniently be set out thus:—

(*a*) Pre-tensioning, where the reinforcing wires are stretched on a special tensioning bed to a predetermined stress, following which the concrete is cast around the wires and left to harden. After a specified time the wires become sufficiently gripped by the concrete, and the ends of the wire projecting from the member may be cut off and the finished unit removed.

(*b*) Post-tensioning, where the concrete units are cast first with holes left, through which the wires are to pass. When the units have hardened sufficiently, they are placed together end to end, the wires threaded through, and subsequently stretched by jacks thrusting against the ends of the completed member. The stretched wires are finally anchored in special end anchorages and the whole cable grouted up to eliminate the possibility of internal corrosion.

Proprietary names covered by patents are associated with each of the above processes, the former being known as the Hoyer method, while the latter method has been developed by Freyssinet and Magnel.

It cannot be said at this juncture that one method is superior to another, but rather that they are complementary, each being the best within its own particular sphere of application. The former method is essentially a factory process, while the latter method is applicable to work on the site, comparison between the two classes of work being closely linked with the relative merits of pre-cast and *in situ* concrete work.

It will be observed that the reinforcement has been described as 'wires,' and not rods, as is customary in the field of reinforced concrete. Ultra high-tension drawn wire up to about ¼ in. in dia. is generally used with a maximum breaking stress of 100 to 110 tons per sq. in., although in some recent experiments medium high-tension rods of large diameter have been used with some success.

The application of very high-tensile wire to the problem of pre-stressing was initially due to Freyssinet, who realised why earlier experiments at pre-stressing, using ordinary mild steel rods, resulted in failure. When the steel wires are subjected to a tension force creep takes place, which reduces the initial tension value, thus constituting a loss of pre-stress. Similarly, concrete, in setting, shrinks, and, when subjected to a pre-compression due to the presence of the pre-stressing wires is liable to creep also, these movements again constituting further losses in the pre-stress. It is found that these losses will entirely negative any pre-stress that can safely be given to mild steel. It is evident, therefore, that the higher the permissible working stress in the reinforcement, the higher the pre-stress, and the less serious the losses.

With the Hoyer system, these losses may constitute as much as 15% of the initial pre-stress, which is approximately 90 tons per sq. in. With the post-tensioning system, the shrinkage and creep of the concrete are permitted to take place before the wires are tensioned; hence these factors do not reduce the pre-stress, which in this case is approximately 60 tons per sq. in. Incidentally, the conditions prevailing before the various losses in pre-tension take place constitute the most severe loading the member is called on to sustain. The increase of stress in the steel reinforcement due to the live loading never exceeds that lost by the above factors, hence all members are actually stressed in excess of the design load stresses before leaving the factory or being accepted on the site.

The safety factor is not so generous as one is accustomed to use in normal reinforced concrete work. So far as the concrete is concerned a safety factor of three can be obtained under live-load conditions, whereas for the steel reinforcement the factor is 1½ approximately. As the reinforcement is a factory made article, while the concrete may be a site product made under less rigorous conditions, these figures should give every satisfaction, particularly when it is remembered that the work, while undergoing pre-stressing, is automatically tested in excess of the design conditions.

No generally accepted code of practice is in existence, at the present time, controlling the manufacture or construction of pre-stressed concrete works. In fact, existing British Standards for the materials used, particularly for cement and aggregate, may require revision to ensure higher quality materials to sustain the higher stresses adopted.

It would be considered singularly inopportune were such codes of practice to be published at the present time, and those engineers contemplating such a step would do well to remember that pre-stressed concrete is still in its infancy, and the premature issue of restrictive codes would tend to halt new processes, stress increases, and other modifications, so prevalent and so essential to the proper development of the technique. Engineers will naturally require some guide, however, in adopting a new process so wholly unfettered by restrictions and codes of practice. Closer co-operation with responsible manufacturers and contractors can, however, in general, provide this necessary control over design and manufacture that the engineer needs to ensure a satisfactory result. In fact, preliminary loading tests can also be carried out relatively cheaply and would well repay the initial outlay, when the introduction of pre-stressed concrete itself effects a saving in cost and a general improvement in a structure by comparison with more traditional methods.

One important point should be noted when approaching the subject of design. Pre-stressed concrete is not a modification or variation of reinforced concrete practice, but a new form of concrete construction requiring an independent and unbiased approach quite free of the conventions so well known and consistently adopted by the designers of reinforced concrete. The introduction of welding in the field of structural steelwork is a comparable technique, following which new forms of construction and methods of design were adopted that would probably be quite impracticable or un-

* From Publication No. 376 of the Institution of Gas Engineers.

economical when using riveted connections. An engineer should therefore exercise great discretion in assessing the merits of a scheme conceived in pre-stressed concrete, bearing in mind also that the reputation of the firm consulted is equally at stake with his own.

In the same way that legal decisions are based to a great extent on English case law, so also should the use of pre-stressed concrete be guided and influenced by similar structures already in existence. Unfortunately, it is not possible to look back more than 15 to 20 years, and in many cases not more than five years covering the post-war period, when pre-stressed concrete in this country became more widely publicised.

Engineers responsible for the design and construction of works where pre-stressed concrete can be used should be encouraged to visit other works in this country and abroad and so build up for themselves a mental picture of what can be done and what has been done. The economics of the various structures examined in this way should also be considered, and, where applicable, the durability and maintenance compared in conjunction with the age of the structure.

Advantages Claimed

Fundamentally, the chief claim of pre-stressed concrete is that the nature of the material is virtually improved, the difficulties and disadvantages encountered in reinforced concrete work, due to the inherent weakness of concrete in tension, being eliminated. It follows, therefore, that the whole section of a structural concrete member, whether beam, slab or column, which, as a reinforced concrete unit, may contain up to about 60% of practically non-load-carrying materials, now becomes effective in supporting the structure.

The size and weight of such a structure will inevitably be reduced, the saving in cost generally being greater than the extra cost involved in providing the pre-stress and the special reinforcement. In any case, an engineer will not readily be prepared to accept pre-stressed concrete work unless it can offer him some advantages over the more conventional forms of construction, and cost is by no means the least of these considerations.

It is well known that concrete, surrounding reinforcement that is subject to tensile stresses induced by the load, fails in tension before the full working stress in the steel can be realised. This is undoubtedly a serious disadvantage for structural work exposed to an atmosphere where industrial processes cause pollution, such as is common to all gas-manufacturing stations. Minute hair cracks form in the concrete in the vicinity of the tension steel, these cracks giving access for moisture, laden with various injurious substances, direct to the steel reinforcement. The elimination of these cracks, due to the state of compression existing in the concrete at all sections, will minimise deterioration due to the above causes and prolong the life of the structure.

Although the maintenance costs on a reinforced concrete structure are, in general, extremely low by comparison with other forms of construction, nevertheless the money that is spent remains an appreciable item of cost that should not be accepted as inevitable. New forms and methods of construction that, while preserving the structural advantages already in our possession, at the same time require even less attention to their external fabric, should not pass the engineer unnoticed.

Owing to the high stresses used in pre-stressed concrete design considerable improvement in the nature of the concrete is expected. The use of vibration, and greater supervision in the proportioning of the materials, care in the use of water for mixing, and special curing devices, should all contribute to produce a higher grade concrete than one is accustomed to expect for normal reinforced concrete work. Permeability should accordingly be reduced and the density increased, and as a result of this the direct attack on the concrete by aggressive atmospheric conditions would be appreciably delayed.

Among the other advantages are the reduced weight of beams and slabs, due primarily to pre-stressing, though to some extent due also to the higher stresses adopted; the appreciable reduction in the amount of steel used; and the greater resilience under the action of impact forces. Arising from these points is the greater ease of handling pre-cast, pre-stressed members, due to their ability to withstand shock and sustain appreciable deflections without cracking.

As would be expected, the high-tensile reinforcement is considerably more costly than ordinary mild-steel reinforcement, while the higher grade concrete is more expensive than normal concrete. A properly designed pre-stressed concrete structure is, however, considered in most cases to be less expensive than its conventional reinforced concrete counterpart.

At the present time, pre-stressed concrete is being applied experimentally to every form of concrete work ranging from fence posts to large-span bridge girders, and engineers should examine carefully the various schemes offered to them, to ensure that the use to which pre-stressed concrete is put is justifiable and economical and not merely of publicity value. There is no doubt that very real advantages are obtained by the use of pre-stressed concrete in many spheres, particularly within the gas industry, but a word of caution is necessary as the technique is still in its early stages of development.

Applications of Pre-stressed Concrete

Some of the various uses of pre-stressed concrete are listed below with details of their application to structural and building works within the gas industry. As might be expected, many of the applications described will be of wider interest also, and it is hoped that work of a pioneer nature may be of use to engineers interested in similar problems.

(A) Piles for Land Foundations

Preliminary tests on pre-stressed concrete piles were first carried out in May, 1949, at the Stanford-le-Hope works of the North Thames Gas Board. These preliminary tests are thought to be the first carried out in this country. They were extremely severe and it is no exaggeration to say that the piles tested fulfilled the tasks allotted with every satisfaction. The object of these tests was to determine the effect of age, reduced section, and pre-stressing on the handling and driving and ultimate strength of the piles.

The test piles were made on the Hoyer bonded wire system and were 10 in. square and up to 35 ft. in length. They were reinforced with four clusters of 2 mm. high-tensile steel wires, while the concrete mix was 1:1½:3 by volume, the minimum ultimate compressive strength of the concrete being 5,500 lb. per sq. in at the release of the pre-stress, and 7,500 lb. per sq. in. at 28 days.

Extreme flexibility was observed during handling, which was carried out by single-point suspension, with the addition of a 'snatch' test, where the pile was lowered and suddenly halted in mid-air. No sign of distress was observed during these tests.

To determine the strength of the head, a final driving test was carried out, using a 2 t. 16 cwt. hammer, falling between 4 ft. and 6 ft. The head under these conditions was ruptured, the pile having been previously driven to a set of 2 in. for 294 blows, or approximately 1/16 in. for 10 blows of 8 ft./t. energy each. The age of the piles varied between 10 days and two months, although it is not recommended that piles as young as 10 days would prove generally satisfactory at the present time.

Following the undoubted success of these preliminary trials, a small number of similar piles were specified on two contracts for the North Thames Gas Board at the Beckton works. Apart from a few minor troubles, to be expected in the early stages of such developments, these piles were driven satisfactorily, exhibiting the same main characteristics that were so evident at the Stanford-le-Hope tests. As would be expected, a static loading test was called for to substantiate the claims made concerning their bearing capacity. In this instance a 10 in. sq. pile, 40 ft. long, was driven to a set of

2 in. for 10 blows of 7½ ft./t. energy each. No settlement was recorded until the test load exceeded 40 t. When the load reached 75 t. the test was stopped and this load left in position for three days during which time an initial settlement of 0.3 in. was recorded; this remained constant for the rest of the time that the load was maintained. It is not suggested, because in this case 10 in. sq. pre-stressed piles replaced 14 in. sq. normal precast piles, that their load-carrying capacity is the same. The carrying capacity of a pile is a function of its surface area and cross-section, and obviously the larger pile must carry the larger load. This test, however, does raise a question as to whether at present many of the piled foundations provided are probably over-cautiously designed. Engineers cannot, however, cut their factor of safety indiscriminately, and must have proper evidence in support of any reductions contemplated. This is particularly so in regard to piled foundations, for which no two sites are the same, the ultimate resistances of the piles on one site alone differing appreciably in many cases. For this reason it is recommended that static loading tests, carried out to failure, should be considered where a number of piles are to be driven or where pre-stressed piles of smaller section are to be adopted. It is hoped that, although only one static test has been carried out and described here, the results so obtained may be of use to engineers contemplating the use of similar piles.

The adequate bonding of pile heads into the superstructure is not quite so straightforward as with the conventional pile. In place of the usual four rods, a 'brush' of wires is exposed, which, if the pile be subjected to an uplift, requires very careful consideration. Examples have already been designed, where the pile head has been left intact, but well hacked and a considerable length embedded in the superstructure, thus relying on the mechanical bond to provide the necessary anchorage.

(B) Piles for River Work

Many large gas-making stations are situated near a river or canal where bulk supplies of coal can be more easily and cheaply handled. This feature inevitably raises the question of berthing facilities, jetties, piers and other associated works. One of the main problems on such structures is the fendering necessary to protect the structure from the heavy impact forces from coal barges and ships.

Once again an opportunity has arisen for testing pre-stressed concrete, in this case under impact conditions, and at the Brentford works of the North Thames Gas Board experimental pre-stressed concrete fender piles have recently been installed. These experiments are preparatory to larger-scale fendering works found necessary to protect a light, elevated, reinforced concrete roadway running along the river front, the whole of which is used either for coal unloading, tar loading or barge mooring.

The design of such fender units raises the much debated question concerning the actual impact force transmitted to fenders from barges, taking into account their displacement, speed, and angle of approach, together with the extra forces due to wind and waves. Variations in the height of the tide also give a wider range to these impact forces, and further complicate the problem.

Before constructing the fenders, which were isolated three-pile units, an impact test was arranged on specially manufactured pre-stressed fender piles considered to be suitable for the work contemplated.

This work was carried out at the request of, and in close co-operation with, the Board by Concrete Development Co., Ltd., at its works at Iver, Bucks. The specially designed fender piles were manufactured on February 18, 1950, and tested on May 9, 1950.

(C) Gantries and Open Frameworks

Many structures under this heading are designed using pre-cast beams, columns and braces. In this field, pre-stressed concrete can be particularly useful, both in regard to its elasticity and ease of handling. Moreover, the pre-stressed concrete member is usually appreciably lighter than its reinforced concrete counterpart; hence transport and handling costs are proportionally reduced.

Examples of this type of structure carried out in pre-stressed concrete are available on the Beckton and Bromley works of the North Thames Gas Board, and further projects are contemplated at both of these works.

The largest project at present almost completed is the provision of over 60 open-frame trestles for supporting large-diameter gas mains and light steel gantries for steam, water and electricity services within the works. These trestles vary in height between 20 and 35 ft., and are supported on two piles. The bases, caps and intermediate braces are cast *in situ*, while the legs are pre-stressed concrete members of taper section, varying from 10 in × 12 in. at the top to 10 in. × 15 in. at the base. A deep pocket is provided in the base, into which these legs are dropped and anchored, this pocket also allowing for some final adjustment in the height of the trestle should such variation be found necessary.

Further projects are in hand, at both the above works, for the provision of coal and coke gantries. These structures will consist of trestles approximately 50 ft. high, spaced at 60 ft. centres, between which span twin pre-stressed beams of tee-section carrying a central shuttle conveyor. These beams will be constructed on the Hoyer bonded wire method and transported to the site and hoisted into position.

After being finally bedded and set true to level and alignment, continuity reinforcement will be added at each support, providing for partial fixity under the action of the live loads.

At the present moment it is proposed that the trestles for the coke gantry will be constructed in ordinary reinforced concrete cast within a blue brick casing, which will be used as permanent formwork. For the coal gantry, pre-stressed trestles are contemplated which will be a slightly larger version of those already described for pipe and cable gantries.

Framed Buildings and Structures

Many opportunities occur in this type of work in which pre-stressed units may be used with advantage, and there are numerous examples throughout the country of single and multi-storey structures carried out at least partially in pre-stressed concrete. In many cases, normal reinforced concrete columns are installed, using pre-stressed beams and slab units, although in some cases the columns also have been pre-stressed, particularly where these are subjected to high wind moments. Where pre-stressed slabs are used, these may take the form of sectional pre-cast floor units comparable with the many types of conventional pre-cast flooring schemes so familiar today.

On the other hand, the units may contain the whole of the main tensile reinforcement, and yet be laid as thin slabs 2 or 3 in. thick over which a final *in situ* slab is cast, uniting the whole of the precast units into one monolithic structure. Such a structure has been built at the Nine Elms works of the North Thames Gas Board, where a new charging floor has recently been constructed within an existing retort house. In this case the supporting columns and beams were carried out in normal reinforced concrete work. Thin, pre-stressed concrete permanent shuttering slabs were placed between the beams, and a 5 in. thick *in situ* concrete topping was added to unite the whole structure. The pre-stressed units contained the whole of the main tension reinforcement for the floor slab, the only extra reinforcement required for the slab being longitudinal distribution mesh reinforcement laid in the topping. It was not considered wise to use pre-stressed beams in this project, owing to the high temperatures in the vicinity of the retort bench, not because pre-stressed concrete has a particular weakness in this direction, but that insufficient information was available at the time concerning the effect of heat on pre-stressed concrete. Further investigations in this matter are contemplated in the near future. A similar form of construction using thin pre-stressed concrete slabs could equally well be used for the construction of walls, eliminating the need for timber shuttering, which at the present time is extremely expensive.

Structures subjected to internal hydrostatic pressure, combined with variations in temperature, are prone to crack under the action of the forces involved, unless the working stresses are kept very low in order that the concrete should not fail in tension.

The introduction of a pre-compression into the walls of tanks will tend to eliminate any tendency for cracks to form. This is particularly useful in tanks partly filled with hot liquids, in which the lower parts tend to expand more than the freeboard sections, resulting in the formation of cracks above the water line. It is considered that the pre-stressing of such tanks could effectively and economically be carried out, although it would have to be done in two directions mutually perpendicular.

Circular tanks, where the walls are subjected almost entirely to circumferential tension forces, can be effectively pre-tensioned by winding bands of high tension wire around a plain concrete or lightly reinforced concrete ring. The wires may be automatically tensioned by the winding process, or, alternatively, turnbuckles may be used, provided proper care and attention be given to the question of friction between the tensioned rod and the concrete ring, to ensure an even distribution of the pre-stress.

This process is eminently suitable for use in the construction of large-diameter gasholder tanks where it is thought very considerable saving in concrete could be made. Many such structures erected above ground level are little different from large-diameter water storage tanks, of which several examples exist in pre-stressed concrete construction. Additional loads have to be carried, however, at the top of a gasholder tank, where the reactions from the spiral lifts are transmitted to the carriage base, and these forces would necessitate the stiffening of the top kerb. Reinforced concrete purifiers have been in service in the gas industry for more than 30 years and have, generally speaking, given excellent service. The extraction of sulphur impurities from the gas, together with the presence of cyanogen at this stage in the process, contribute to provide the most aggressive agents that a normally reinforced concrete structure is called upon to withstand. As a purifier box has, in addition, to be gas-tight, its design calls for the most careful attention even to the smallest details. The application of pre-stressed concrete to such a structure is, however, receiving full consideration at the present time, although the publication of any information on the subject would at this stage be rather premature.

Civil Defence

During the last war, stocks of standard pre-stressed beams were held by some railway companies to provide quick repair units for damaged bridges. These units are admirably suitable for handling and movement by inexperienced labour under difficult conditions, being lighter and more elastic than their equivalent in reinforced concrete. The use of steel, which during a war would be strictly limited, is cut down to the very minimum in these units.

Each engineer knows best the needs of his own works, but the following suggestion may be of interest:—

(1) Light pre-stressed concrete slabs to cover holes made in floors or roof slabs.

(2) Short columns (say, 4 in. × 4 in. or 6 in. × 6 in. in cross-section) to underpin structures at close centres in the event of damage to the main supports near ground level.

(3) Pre-stressed concrete shores, which may be used on a mass concrete base to support the heavy brickwork of an old retort house or other building, loosened or rendered dangerous by blast.

(4) Pre-stressed concrete sectional units for assembling on the site to form small hoppers, tanks, control cabins for essential workers, or screens to protect vulnerable plant.

(5) Light A-frames for spacing at close centres to support overhead cables, steam mains, water services and possibly gas mains.

(6) The careful design of present works, eliminating points of obvious weakness, and the full utilisation at least of the lessons learnt in the past war in respect of structural failures.

In each of the above proposals it is, of course, of paramount importance that the units provided should be as light as possible so that they may be handled by a small number of men without mechanical aid other than perhaps a small trolley for transporting the units across the works, and block and tackle for hoisting purposes.

Concrete of any form has considerable protective value against fire and radio-activity as well as strength to resist blast. These factors are among the main products of an atomic explosion, which, we are given to understand, will be very many times more severe than ever experienced previously with ordinary high-explosive missiles. It is quite impossible, of course, to set out any standards of design, and one must look to higher technical authorities for guidance should the necessity arise. The resistance of concrete to radio-activity is known by comparison against a recognised standard such as lead. Although the intensity of the rays produced from an atomic explosion is not known, an agreed minimum standard of protection could be offered.

Similarly, ordinary concrete can withstand temperatures up to about 1,000° to 1,200°C. before it becomes friable and disintegrates. Of course, its compressive strength is diminished; in fact, loss of strength commences about 250° to 300° C. and at about 600° C. its strength is about 50% of its value at normal temperatures.

Obviously, therefore, considerable thought would be required to produce a design capable of withstanding these three factors simultaneously, and it would be impracticable to incorporate such designs in normal structural work at present without the fullest justification.

Special Applications

Examples of numerous specialised applications are available. Among the more interesting subjects are the following:—

(1) Structures of annular cross-sections, such as pressure pipes, ducts and tunnels. (See *J. Inst. Struct. Eng.*, March, 1945.)

(2) Cofferdams and caissons. (See French publication on 'The Variety of Applications of Pre-Stressed Concrete,' by M. Lalande.)

(3) Machine frameworks. (See notes on 'Hydraulic Presses,' by E. Freyssinet in his paper, 'Pre-stressed Concrete: Principles and Applications,' to the Institution of Civil Engineers, November 17, 1949.)

(4) Sundry repair and reconstruction works, including under-pinning.

The above constitute a selection from the many examples encountered that may, in due course, prove of special interest to the gas engineer. Pressure pipes described by the late Dr. Mautner under the above reference were tested to failure. The specimen used had an internal diameter of 800 mm. (31.5 in.) and withstood an internal hydraulic pressure of 330 lb. per sq.in. before the first signs of water appeared on the outer face. The pipes were manufactured by winding with a controlled-tension high-tensile wire reinforcement around the perimeter of a spun concrete pipe, the wires being finally covered by concrete from a cement-gun.

In regard to the pre-stressing of tunnels, such a project is now being contemplated for the conveyor tunnel associated with the proposed coal gantry at Beckton gasworks, to which previous reference has been made. The tunnel will be composed of short pre-cast box sections, through the four corners of which will be threaded high-tensile wire cables post-tensioned by the Freyssinet method when all the units have been placed in position and properly aligned. In regard to repair and reconstruction work, reference may be made to what may constitute the first direct application of pre-stressed concrete to work in the gas industry. The project consisted of strengthening the existing piled raft foundations to a vertical retort installation at the Brentford works of North Thames Gas Board in 1947. This work was carried out under the

supervision of Rendel, Palmer, and Tritton, and the pre-stressing work was done by Dow-Mac (Products), Ltd.

The work was somewhat involved and it is not proposed to describe it in detail. In general, however, the raft was strengthened by the introduction of four longitudinal and five transverse cables. Each transverse cable consisted of 105 wires of 0.2 in. dia. while the longitudinal cables contained 210 wires of the same diameter. These wires were stressed up to approximately 60 t. per sq. in., three at a time, and subsequently anchored into heavy end plates that were finally encased in concrete.

Conclusions

It is confidently believed that the underlying principles and advantages claimed are of considerable value to the gas engineer, whose structures are, perhaps, subjected to more severe conditions than are usually met elsewhere. A number of important points should be noted, however, in the execution of pre-stressed concrete works, these being summarised below :—

(1) Pre-stressing is most efficient when the working stresses in concrete and steel are as high as possible.
(2) To comply with the above, the use of high-grade materials, particularly properly graded and compacted and cured concrete, is essential.
(3) Steel fixing must be more accurate than is accepted in normal reinforced concrete practice, owing to the very high stresses used.
(4) Pre-stressing should only be done by properly trained and experienced men.
(5) All materials should be properly tested before use and periodically during the course of the work.
(6) The estimation of the pre-stress induced in the wires must be checked accurately by measuring the elongation of the reinforcement and comparing with the calibrated pressure gauge on the jack, or some other reliable process such as the acoustic method.
(7) Design should be carefully prepared on a pre-stressed concrete basis, and not on a reinforced concrete basis and subsequently adapted.
(8) Proper attention must be given to the end anchorage and the heavy stresses induced by the tension forces in the case of the post-tensioning method.
(9) Cables designed for post-tensioning must be properly and completely grouted to prevent corrosion within the duct.
(10) It is advisable to maintain the greater covers of concrete usually adopted for gasworks structures, when using pre-stressed concrete.

If the above points are given due consideration, it is believed that, in most cases, a structure 10% to 30% cheaper and lighter will be produced by an experienced engineer. Once again, however, the engineer who, no doubt, already has as much work in hand as he can deal with, is called upon to start studying again, this time the subject of pre-stressed concrete. The theories involved can be complex, since the work is not confined to simple span beams but extends to continuous structures and frames, circular sections pre-stressed in two directions, and the analysis of the stresses in structural members at three stages in their life—*i.e.*, at the release of pre-stress; in use under dead load conditions; and in use under full dead and live load conditions. Many other more involved problems are available for those willing to consider them, and the engineer will once again be reminded of the fact that he has never really left school. It would perhaps be opportune to remind those interested that series of lectures, covering one week's duration and dealing with the main aspects of pre-stressed concrete, are held periodically by the Cement and Concrete Association for those intending to study the subject. Attendance at one of these courses would no doubt give the required start and enable subsequent study and investigation to be carried out more easily.

In conclusion, it is hoped that the British engineer will appreciate the merits of this fascinating subject and demonstrate to fellow engineers throughout the world, in no unmistakable way, the reliability and sound workmanship so characteristic of all that he undertakes.

DISCUSSION

Dr. J. Burns, G.M. (Chief Engineer, North Thames Gas Board) said he occupied the rostrum for a few minutes not as an expert on ferro-concrete or pre-stressed concrete but as one who had from time to time to determine the best type of structure to erect on a gasworks. He did not intend to go over the various arguments as to the relative merits of ferro-concrete, pre-stressed concrete, mild steel, brick, and so on, but would like to look at one aspect only of ferro-concrete and pre-stressed concrete—that of repair and maintenance. He thought that this was one of the most important subjects to be considered when dealing with structures of the type in question.

In the area of the North Thames Gas Board there was a large number of ferro-concrete structures put up principally between 1925 and the middle '30s, and he was going to be so bold as to say that they had no really satisfactory method of repairing those structures. He appreciated that this would probably lead to a number of protests, but that was the conclusion to which they came in the Gas Light and Coke Company in the middle '30s. At that time, to overcome those difficulties, they altered the specification for ferro-concrete in two respects, in respect of the concrete mix and also the coverage given to the reinforcement.

The type of repair which was necessary was brought about by the introduction of superficial cracks due to weathering, which allowed acid-laden moisture to penetrate through the concrete and reach the reinforcement, bringing about a gradual deterioration. The alteration of the specification in the middle '30s gave a greater coverage of concrete and so increased the length of time between repairs, but the principle was still very much the same.

They had one or two other methods of dealing with it. They introduced brick cladding on the ferro-concrete structures. That, of course, was quite satisfactory, but it was necessary to weigh up the capital cost of the brick cladding and the increased weight on the foundations against the decreased repair and maintenance.

They then came to pre-stressed concrete, and asked themselves what benefits it was likely to give them in the matter of repair and maintenance. He thought that the very first point was that pre-stressed concrete was possible only if very accurate attention was paid to the quality of the mix and the method by which the mix was constituted, so that fundamentally one had a better material. Secondly, in pre-stressed concrete the concrete was in fact in compression. That, he thought, was the most important point, because with the concrete in compression there was less likelihood of superficial cracking and of ingress of acid-laden moisture, and so, it was to be hoped, a longer life.

Failure in Ferro-Concrete Tanks

The other failure in ferro-concrete structures occurred very often in ferro-concrete tanks, where there was a leak at a construction joint. Most people would have looked at a ferro-concrete liquor tank and seen the line of tar and liquor where there was a construction joint. With pre-stressed concrete there was a possibility of the concrete knitting better together at a construction joint and obviating that failure.

Pre-stressed concrete, he thought, opened up a large new vista. There were certain risks associated with its use, but in view of the scientific development which it had undergone, and the tremendous amount of thought which had been given to it, they were risks which the engineer should be prepared to carry. The risk was, he appreciated, greater when it was going into the foundations of a very big building, but he thought that they knew sufficient about it now to make it possible to say that they should be prepared to take a fair share of the risk in the development of pre-stressed concrete.

Mr. **A. T. Phillip** said that reinforced concrete construction had been used on gasworks plant and structures for quite a number of years, and certainly for 30 years; indeed, it was well over 40 years ago that as a junior at Beckton gasworks he carried out various experiments in reinforced concrete, and, with the impudence or optimism of youth, translated those experiments into actual works—fortunately, perhaps, below ground. As was well known, the atmospheric conditions prevailing within the precincts of gasworks could become very aggressive, and the conditions associated with the gasworks plant itself could become even more aggressive, so that it was to be expected that reinforced concrete structures under those conditions would sooner or later show signs of deterioration,

due partly, presumably, to the inherent weakness of the chemical composition of the cement itself and partly due to the defects in construction and in design.

In regard to the chemical composition of the cement, there was a considerable percentage of lime present after hydration, and it was this lime which was attacked by the weak acids formed from the moist atmosphere, laden as it was with industrial chemical impurities, the chief of which was, he supposed, sulphurous acid, forming a coating of sulphate over the concrete structure which in course of time caused flaking, or the pores of the concrete became open due to the removal of the lime, both of those causes eventually exposing the steelwork to corrosion, with the resultant spalling and discoloration of the concrete.

Unfortunately, the steel reinforcement was most effective when near the surface, so that engineers had been very loth unduly to increase the cover, although that had been the answer to some of the earlier problems; but that again did not entirely eliminate the trouble but merely deferred the evil day. Defective construction was also an accessory to the main trouble, in that cracks appeared in the concrete, construction joints opened, and the correct cover to the reinforcement was not fully maintained. All those causes, of course, accentuated the corrosion of the steel.

With that in view, he welcomed the introduction of pre-stressed concrete, for, although the chemical problem of the deficiency of the cement remained, yet the compression induced in the concrete itself should, as Dr. Burns had pointed out, eliminate to some extent the cracking of the concrete, and the higher stresses worked to should, of course, improve the structure and the density of the concrete. For those reasons, and for others which the author had mentioned, pre-stressed concrete structures deserved full consideration.

Leading to Stagnation

Unfortunately, the introduction of any new form of construction was slow. Engineers were always anxious to see what other engineers had done before they embarked on any new venture, and, while this policy was understandable, it led to a certain amount of stagnation. He would like to say, with some diffidence, that it was the duty of engineers to keep abreast of their subject, including all the new developments, and they should be cognisant of the merits and demerits of these developments. The North Thames Gas Board had encouraged the use of pre-stressed concrete, for, while it might cost more in the initial stages, due to proper investigations having to be carried out and certain tests made, it was felt to be justified if for the extra cost and the judicious use of pre-stressed concrete they got a better structure with a longer trouble-free life.

The intervention of the war had to a certain extent slowed up progress in this field, and there were not many structures, in this country at any rate, which could be pointed to as having been up for some time. The engineering staff of the Board, however, had been encouraged to study the subject, and various qualified members of the staff had attended a course of lectures arranged by the Cement and Concrete Association with a view to getting a proper knowledge of the principles of the design and construction of pre-stressed concrete structures. At the same time, more care must be exercised in the making of the concrete itself, and that had to be watched very carefully on the site. Owing to the higher stresses adopted, and the reduced sections of the various members, greater precision on the site was required, which in turn called for qualified inspectors and engineers. Inevitably there must be a transition period in developing from the old to the new, and collaboration was needed between designers in the drawing office, engineers, and contractors. He felt that the author had very ably opened up this new field and excited interest in it, and he hoped that it would receive very full consideration.

Mr. W. T. Gedge (Eastern Gas Board) remarked that much had been said on many occasions about the pre-stressed concrete work which had been carried out on the Continent, but little was known of the application of this new development in this country. He congratulated the author on the paper, which gave much useful information, and supported the author's view that the advantages which this new form of construction gave, in making it possible to build in concrete which did not crack, were of considerable value to the gas engineer.

After describing correctly the losses in the initial pre-stress which occurred with the Hoyer system by reason of shrinkage and creep of concrete, the author had dealt with the post-tensioning system and stated that 'with this system the shrinkage and creep of the concrete are permitted to take place before the wires are tensioned.' That was incorrect. The shrinkage would, of course, take place while the concrete was hardening and before the wires were tensioned, but the creep of the concrete depended entirely on the load applied. In other words, with post-tensioning systems there was a loss in the initial pre-stress due to creep of the concrete.

The difference when comparing the Hoyer or bonded wire system with the post-tensioning methods was that with the former there was a loss in the initial pre-stress on account of shrinkage and creep, but with the latter system there was only the loss due to creep. From an experiment made by Eugene Freyssinet, the French engineer, it was known that the shortening of concrete stressed to 1,500 lb. per sq. in. would be about 0.5×10^{-3} in. per sq. in., which was equal to about 1 in. in 166 ft. This creep took place slowly and at a decreasing rate, being about half of its total after a period of six months. In fact the creep was known to go on at an ever-decreasing rate for about 10 years, but during the latter part of this period the curve was almost a straight line; there was very little slope to it. The figure of 60 tons per sq. in. given in the paper as the approximate pre-stress applied to a post-tensioned member would be reduced to about 52 tons per sq. in. after the total creep of the concrete had taken place.

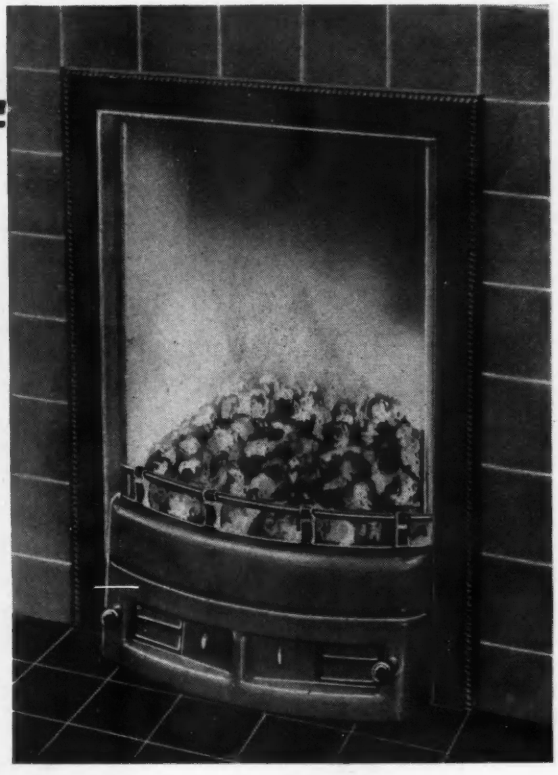
Referring to the subject of piled foundations, the author had admitted that the pre-stressed piled foundation at Beckton works had a lower factor of safety than that which would be allowed for in a pre-cast piled design. To take care of handling stresses, pre-stressed concrete piles could be of smaller section than pre-cast piles, and it seemed that the manufacturers were giving more consideration to this aspect than to the fact that the carrying capacity of a pile was a function of the surface area and cross-section. If a 10 in. square pre-stressed concreted pile could replace a 14 in. square pre-cast pile the frictional resistance was reduced by 30%. In soils having a poor load-bearing value the frictional resistance was an important factor, and the local conditions would have to be carefully considered before a decision was made on the type of pile to be used.

Foundation Gasholder

The Eastern Gas Board would in the near future be constructing a piled foundation for a 1 mill. cu.ft. capacity gas holder at Harlow New Town. The nature of the ground at the site reserved for the holder was extremely poor so far as load-bearing was concerned. From data obtained by a pre-piling survey it was found that it would be necessary to drive piles to a depth of between 48 and 50 ft. At this depth the frictional resistance to the driving of a 14 × 14 in. pile was approximately 40% of the total resistance. For the holder foundation a total of 282 14 in. square pre-cast concrete piles would be driven. Assuming that a 10 in. square pre-stressed concrete pile would provide the same direct bearing as that given by a 14 in. square pre-cast pile it would be necessary, if pre-stressed concrete piles were substituted, to increase the number of piles to 316 on account of the lower frictional resistance.

The author had mentioned that there were a few minor troubles when the first pre-stressed concrete piles were driven at Beckton works. It would be interesting to know what those troubles were, as knowledge of the early experience of a new development was most valuable and might prevent similar troubles being encountered on other work. It would also be of interest if the author was able to give comparative costs of the two types of driven piles.

Mr. W. R. Garrett (Northern Gas Board) said this subject had certain limitations which were peculiar to the North. Pre-stressed concrete was dependent, among other factors, on it being possible to produce a first-class concrete of consistent high strength. This was reasonably easy in the South, because of the ample supplies of good, sound aggregates and freshly made cement. In the North the aggregate was rarely free from a small proportion of coal; a large percentage of sandstone was also present, and in addition the cement supplies were rarely fresh. The combined effect of these factors meant that it took them all their time, with a reasonably dry mix, to average a crushing strength of 3,000 lb. per sq. in. for a 1:2:4 mix at 28 days. It was true that they could use Whinstone aggregates, but this increased the cost and in particular detracted from the economic advantages. He was not sure of the present-day cost of aggregate in London, but Whinstone chippings in the North were 22s. 1d. a ton, gravel, $\frac{3}{8}$ to $\frac{3}{16}$ in., was 15s. 6d. a ton, and sand 11s. 3d., so that it



ACCENT ON ECONOMY!

METRO GRATES HAVE BEEN FAMOUS FOR ECONOMY AND EFFICIENCY FOR OVER A QUARTER OF A CENTURY THEY ARE EASILY INSTALLED, TROUBLE FREE AND OF PLEASING APPEARANCE

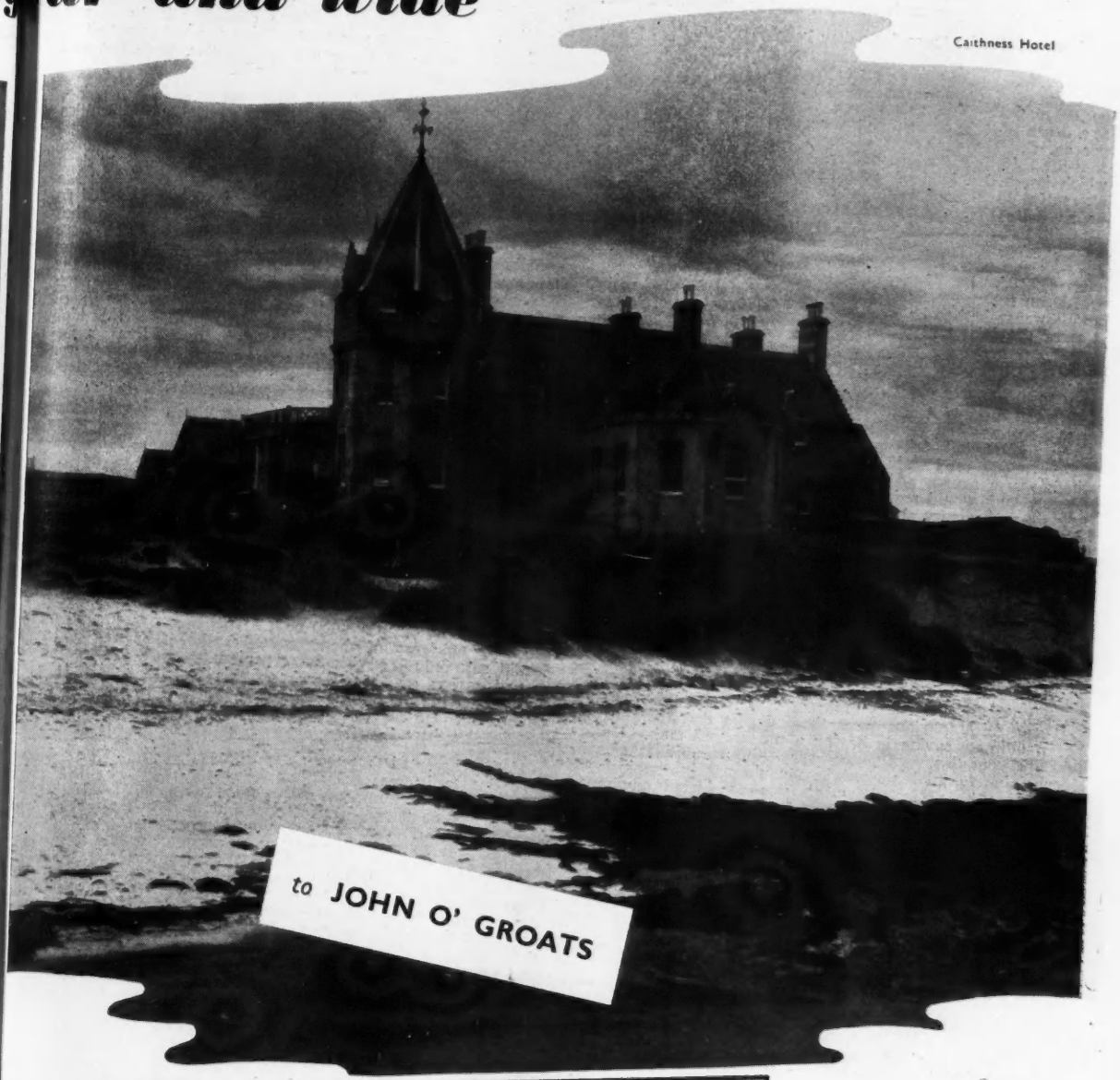
Metro COKE GRATES

FLAVELS of LEAMINGTON

Established in the year 1777

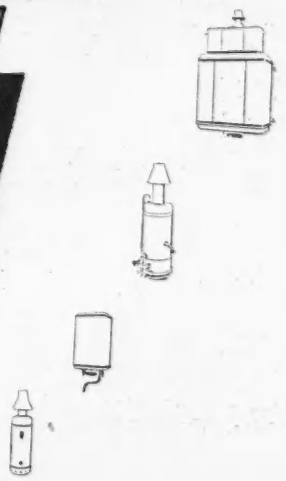
serving far
from LANDS END
MAIN
gasp
COO
R. & A

...ing far and wide



...s appliances

COOKERS · SPACE HEATERS · WATER HEATERS



R. & A. MAIN LTD · MAIN WATER HEATERS LTD.

would be easily appreciated that any advantages gained had to be very carefully considered when the aggregates were poor.

However, despite those facts they had investigated the possibilities of using pre-stressed concrete gasholder tanks, and, while it was dangerous to quote figures, their findings for a tank 183 ft. in diameter and of 33 ft. 10 in. total depth might be of interest. The site chosen was reasonably level, and at a depth of 2 ft. was suitable for carrying a load of 1½ tons per sq. ft. The tank was to accommodate a 3 mill. cu.ft. four-lift spirally-guided gasholder, having 42 spiral carriages, which imposed a load of ±8.6 tons on the tank walls. The alternative to a pre-stressed tank was one which was welded or riveted. The approximate comparison was as follows. The pre-stressed concrete tank, excluding any excavation or backfill, and also excluding inlet and outlet pipes, would cost £27,000; the riveted tank would cost £33,950, and the welded tank £33,300. In other words, there was a saving of about £6,300 on the pre-stressed concrete construction, out of which an allowance had to be made for excavation and also for the cost of the inlet and outlet pipes.

A comparison of the steel figures was of interest. The amount of steel in a pre-stressed tank of the size in question was 10 tons, while for the welded or riveted tank it was 530 tons. In addition, the pre-stressed tank would require certain formwork, which in the case in question would need 55 tons of steel, but it must be remembered that that formwork would be used again on other tanks. In regard to timber, which was a source of worry in these days, the pre-stressed concrete tank would require 10 standards of timber, while for building an ordinary slab foundation 1½ to 2 standards would be ample. So far as the completion time was concerned, the total time for the pre-stressed concrete tank was estimated —all these figures were estimates—at 30 weeks. For the riveted tank time had to be allowed for the contractor to get on the site, and then for the steel contractor to come on, and it would be about 52 weeks. It would also be about 52 weeks for the welded tank.

An Ultimate Saving

It was fairly obvious from these figures that there would be an ultimate saving in having a pre-stressed tank. Unfortunately—and this was another snag—the possibilities of subsidence due to mining operations could not in the instance in question be neglected, and it was considered unwise to jeopardise such a promising new form of construction.

An important factor in placing orders to-day was to make full use of available materials. With the rapidly-changing conditions, it was difficult to decide what the position would be in the years ahead. It would be noted that for a pre-stressed concrete gasholder tank cement and timber requirements were high, and it would appear that this at the present moment was a distinct disadvantage. Pre-cast, pre-stressed units made under factory conditions would economise in formwork and should show substantial savings, and at least in this respect the gas industry must pay every attention to pre-stressed concrete.

Mr. **D. H. New** (Concrete Development Company) remarked that the stresses given in the paper might be a little misleading. With the Hoyer process it was usual to work to 2,500 lb. per sq.in., and in some cases 3,000. He would emphasise that the experience of France and Belgium and Sweden was all available in this country, so that engineers should not be deterred from going on with schemes because of lack of available experience. He would add to the points in favour of pre-stressed concrete what might be quite a minor but a very real one—namely, an automatic test to each beam. As one released the wires, so one stressed the concrete up to the maximum that it would ever attain during its working life, and if one was going to get a failure in the concrete it was because one had a very dud lot of concrete. He thought that the only failures which were known in pre-stressed concrete were those which had taken place upwards because of the dud concrete. If the beam behaved properly and had its correct camber when the pre-stress was released, it was a guarantee that one would have a good product.

He was very glad to see the question of piles so well dealt with. He would emphasise that the great point in favour of pre-stressed piles concerned their handling. The trouble with the normal reinforced concrete pile was that when it was in position it was already cracked, and there was further trouble in driving. The pre-stressed concrete pile was designed against cracking, and when in the vertical position ready to drive it was in the same state as when one finished casting it and took it off the beds. On the question of piles, it was important to use a solid pre-stressed concrete pile only in its correct place. If it was desired to take friction into account a hollow pile could be used; that was a simple matter, though it was not quite so economical as the solid pile.

Mr. **Gardner,** in a brief reply, said that in regard to piling, Mr. Gedge had asked for details of the minor difficulties which were encountered on the works. They had carried out experiments on the time of driving after casting, and some of the first piles driven at Stanford-le-Hope were driven 10 days after they were cast, which was very early in their life; the normal period was 28 days or even longer. They wanted to see whether the piles could be driven earlier, and to that were due most of the preliminary difficulties which were encountered. They were overcome by lengthening the time between casting and driving. He accepted the stresses for the Hoyer process mentioned by Mr. New—namely, 2,500 lb. per sq.in. As to the difficulties encountered in the North of England in regard to aggregates, he must emphasise that high stress in the concrete was essential; otherwise the losses represented a high proportion of the stress used. Unless it was possible to get a high stress in the concrete, and in the steel, the economy of the whole system was at stake.

CENTRAL HEATING — Concluded from p. 174

new boiler, naturally the new boiler would be cheaper to run due to its higher efficiency—say, 80%. Therefore a 10% differential existed in running costs in favour of the new installation. If they took the 16K boiler detailed previously as an example they found that, allowing for fixing, there was an approximate differential of £90 in capital costs. Therefore, in that area with 4,500 degree days per annum, an installation of this type would cost approximately £200 per heating season with gas at 3s. 6d. per 1,000 cu.ft. This figure was based on the 70% efficiency of the converted boiler. The new boiler would cost only ⅞ of this figure per annum, say, £175, or an annual saving of £25. Hence on this basis it would take approximately four years to cancel out the capital charge differential. He suggested that conversion of the boiler was justified by these figures.

If they accepted that the central heating load was undesirable due to its seasonal nature, then they must extend the argument to all forms of space heating appliances. Indeed, central heating adopted on a general scale had a better load factor than a number of smaller appliances such as gas fires. This was due to the higher relative efficiency of central heating boilers, say, 70-80% against 50-55% for gas fires. Further, there was a general desire among consumers to avoid the inconvenience occasioned by solid fuel for central heating. In the ultimate, the consumer would achieve these aims, and he suggested that if the gas industry did not meet their demands then someone else would. In recent years local authorities had given much consideration to thermal electric district heating schemes. If these schemes were to supply the central heating load, and as a corollary the supply of hot water, then gas would only have the cooking and industrial fields in which to operate. The former would be subject to fierce competition from the new thermal industry thus set up. Under these conditions the sales of the gas industry would result in a serious decline. They had already lost the lighting load and had suffered some reverses on the cooking and water heating fronts. He felt that in the near future with improved distribution facilities arising from a grid system they must maintain and strengthen their grip on central heating.

A gas boiler could not carry an overload to the same extent as a solid fuel boiler, due mainly to the limitations imposed by size of gas supply and combustion space. The costs of gas fuel were, of course, rather high, and he deemed it advisable to stress this to the consumer at the first interview. Regarding the use of high/low thermostatic control, this would be extremely effective on the 'Hypact' burners and would constitute an additional safety factor. He did not deal with such control mainly because they did not fit them on conversions at Stockton. The adoption of a second relay valve meant the addition of another expensive item of equipment. As stressed earlier in the paper, it was important to keep costs within reasonable limits on a conversion unit; hence the omission of the control mentioned. He agreed that on/off control was desirable on boilers heating greenhouses due to the effect of solar heat on the large areas of glass in the structure.

AT A GAS WORKS IN THE NORTH OF ENGLAND.

FIVE PURIFIERS 45 FT. x 35 FT. x 6 FT. WITH MILBOURNE OUTSIDE VALVES.

COMPLETE PURIFIER INSTALLATIONS

WITH C.I. OR STEEL BOXES

C. & W. WALKER, LTD. DONNINGTON. Nr. WELLINGTON—SHROPSHIRE

'Phone: Wellington-Shropshire 12 'Grams: "Fortress," Donnington, Shropshire

LONDON OFFICE: 70, VICTORIA STREET, S.W.1. 'Phone: Victoria 5842. 'Grams: "Fortress," Sowest, London.

MILNE'S METERS LTD, EDINBURGH & LEEDS

OXIDE

DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON
Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.
Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873
PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.
Telegrams: "Purification, Stock, London." Telephone: London Wall 5077

"KLEENOFF"

THE COOKER CLEANER
Tins for Sale to Consumers. In Bulk for Works Use

OXIDE OF IRON.

BALE & CHURCH, LTD.
33, ST. MARY AT HILL, LONDON, E.C.3.
Telephone: Mansion House 1156. Telegrams: "Balefire, London."

The
LIMIT OF EFFICIENCY
CAN BE REACHED
by the use of
LUX
GAS PURIFYING MATERIAL

Sole Importers:
HARRISONS (London) LIMITED
66, Mark Lane, LONDON, E.C.3
Telegrams: Birchrock, London Telephone: ROYal 3120

PATENTS

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice Handbook, and Consultations free. 146a, Queen Victoria Street. London, E.C.4. Phone: City 6161.

I SHALL cede British Patents No. 35372-3-47 relating to revaluation of acid pickling water, and No. 31493-4/46 process for the purification of lighting gas. Write to: Fassina, 15 Rue Linne, Paris.

REPAIRS

BRIGHT, SON & CO.
(CLERKENWELL) LTD.
FOR PUBLIC LIGHTING.
CLOCK CONTROLLER REPAIRS.
20 Northburgh St. Clerkenwell, E.C.1. Clerkenwell 7171. and at 17 & 18, Gt. Sutton St. Clerkenwell, E.C.1. London Wall 0267.

LEEDS X.L PLASTIC FIRE CEMENT
FOR
BUILDING & REPAIRING
FIREBRICK WORK ETC
LEEDS X.L. FIRE CEMENT CO., HYDE PARK, LEEDS.

FIRE!
WHERE'S YOUR
NU-SWIFT?
The World's Fastest Fire Extinguishers — for every Fire Risk
Pressure-operated by sealed CO_2 Charges
NU-SWIFT LTD. • ELLAND • YORKS
In Every Ship of the Royal Navy

APPOINTMENTS VACANT

THE WOODALL-DUCKHAM COMPANY

TRAINING SCHEME FOR OPERATING ENGINEERS.

THE WOODALL-DUCKHAM COMPANY offers training facilities in gas and coke making processes, including the heating up and putting to work of Continuous Vertical Retorts, Intermittent Vertical Chambers, Coke Ovens and By-Product Plants, together with some experience in Laboratory work and Plant Construction. Permanent positions on the Outside Operating Staff will be available to suitable men at the end of the 4 to 5 years' training period.

Applicants should be between 18 and 23 years old and progressive salaries will be paid according to age, education and previous experience, if any.

Applications, with full particulars, should be sent in the first instance to: The Personnel Officer, The Woodall-Duckham Company, 63-77, Brompton Road, London, S.W.3.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION.
ASSISTANT WORKS ENGINEER.

APPLICATIONS are invited for the position of ASSISTANT WORKS ENGINEER at the Aylestone Road Works of the Leicester Undertaking.

Applicants should have a sound practical knowledge of Gas Works practice, carbonisation in continuous vertical retorts, fully automatic Water Gas Plants, and supervision of labour.

The successful applicant will be responsible for Gas production at the Aylestone Road Works.

Commencing salary will be not less than £750 per annum.

The successful candidate may be required to pass a medical examination, and the appointment will be subject to such superannuation scheme as may be adopted by the Board.

Applications, stating age, and giving full details of qualifications and experience, together with the names of two referees, should be received by the undersigned not later than February 3, 1951.

C. C. WOOD,
Divisional General Manager.
Gas Offices,
Millstone Lane,
Leicester.

EAST MIDLANDS GAS BOARD

ENGINEERING ASSISTANT—HEADQUARTERS.

APPLICATIONS are invited for the appointment of ENGINEERING ASSISTANT at the Headquarters of the East Midlands Gas Board. The commencing salary will be not less than £800 per annum.

This is the only engineering appointment at the Board's Headquarters. The work will consist mainly of the preliminary examination of applications from Divisions for authorisation of capital expenditure on engineering projects, but it will also involve a certain amount of co-ordinating and secretarial work, more particularly in connection with the functions of the Board's Engineering Committee.

Associate Membership of the Institution of Gas Engineers will be a minimum qualification, and membership of other kindred Institutions or the possession of an appropriate degree will be taken into account in assessing the suitability of candidates.

The successful candidate may be required to pass a medical examination, and the appointment will be subject to such Superannuation Scheme as may be adopted by the Board.

Applications stating age, education, qualifications and experience, together with the names of two referees, should be addressed to the undersigned to reach him not later than January 25, 1951.

A. GWYNNE DAVIES,
Secretary.
Beverley House,
University Road,
Leicester.

SCOTTISH GAS BOARD

HEADQUARTERS STAFF.

APPLICATIONS are invited for the appointment of a SALES AND PUBLICITY ASSISTANT. Applicants must be experienced in all matters relative to Sales and Publicity and should possess administrative ability.

The salary will be within the scale APT. Grade XII Provincial A. (£645-£770 per annum).

Applications, stating age, experience, qualifications together with *copies* of two Testimonials, should be made to the undersigned not later than fourteen days from the publication of this advertisement.

A. T. HERD,
Secretary.
Scottish Gas Board,
6, Randolph Crescent,
Edinburgh, 3.
C/9.

SCOTTISH GAS BOARD

EDINBURGH AND SOUTH-EAST DIVISION, FALKIRK DISTRICT.

ASSISTANT TO THE DISTRIBUTION SUPERINTENDENT.

APPLICATIONS are invited for the above post. Applicants should have had experience in all branches of Gas Distribution and should hold Certificates of the Institution of Gas Engineers in Gas Supply.

The salary for the post will be £385/20/£465 per annum. The successful applicant may require to pass a medical examination.

Applications, stating age, qualifications and experience, together with *copies* of two recent Testimonials, should be received by the undersigned not later than 15 days after the appearance of this advertisement.

WM. EWING,
District Manager.
Gas Works,
Falkirk.
January 1, 1951.

SCOTTISH GAS BOARD

LANARKSHIRE GROUP.
ACCOUNTANT.

APPLICATIONS are invited for the post of ACCOUNTANT to the Lanark County District with headquarters at Uddingston.

Applicants should be experienced Accountants holding a recognised accountancy qualification, and having a thorough knowledge of office management and organisation. A knowledge of Gas Accounting will be an advantage.

The salary will be in Scale Grade A.P.T. X, £570-£670 per annum with placing according to qualifications and experience. The successful candidate will be required to pass a medical examination and the appointment will be subject to the provisions of such Superannuation Scheme as may be adopted by the Board.

Applications, giving full particulars of age, qualifications, experience and present position, accompanied by references, and endorsed "Accountant," should reach the undersigned not later than January 29, 1951.

FRED. R. MITCHELL,
Group Manager.
Gas Offices,
Uddingston.

SCOTTISH GAS BOARD

FIFE GROUP.
DUNFERMLINE DISTRICT.
GROUP DISTRIBUTION SUPERINTENDENT.

APPLICATIONS are invited for the position of GROUP DISTRIBUTION SUPERINTENDENT.

The salary will be on Scale Grade IX (£520-£620) with placing according to experience.

Candidates, in applying, should state technical qualifications, giving full details of previous experience with particular reference to use of Towns Gas for Industrial purposes and outlining previous experience in preparation and carrying out of integration schemes in high, medium, and low pressure distribution.

Applications to be sent in to reach the undersigned not later than February 1, 1951, with *copies* of Testimonials or the names of two persons to whom reference can be made.

The position is in the superannuation class and will be subject to such superannuation regulations as may in due course be made.

Medical examination may be required.

A three-apartment house at moderate rent is available with immediate entry.

DAVID L. DICKSON,
Group Manager.
Scottish Gas Board,
Fife Group,
Gas Works,
Grange Road,
Dunfermline.
January 8, 1951.

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

NEW SUBSCRIPTION and CLASSIFIED ADVERTISEMENT RATES OPERATING FROM JAN. 1, 1951.

Subscription Rates: Home and Empire :- 52/- per annum; Foreign :- 60/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words) - minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

APPOINTMENTS VACANT (ctd.)

RETORT HOUSE FOREMAN.

REQUIRED BY 800-900 MILLION WORKS IN VICTORIA, AUSTRALIA.

KNOWLEDGE of Glover-West Carbonising Plant, including supervision and control of Heats and general Retort Plant, operation and maintenance. Good opportunity suitable man. Salary to start, £800, plus superannuation benefit. Accommodation and passage can be arranged—Details at interview. Replies to No. 9947, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.

APPLICATIONS are invited from suitably qualified persons for the position of Distribution Draughtsman, Walsall District.

Preference will be given to candidates with a knowledge of surveying and laying of low and high pressure gas mains.

The salary will be within the range of Grade VII (£450-£530) of the Salary Scales of the National Joint Council for Gas Staffs.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications, stating full particulars of age, experience and technical qualifications, and giving the names of two referees, should be addressed to: Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.

WALSALL DISTRICT.

CLERK OF WORKS.
(Temporary Appointment).

APPLICATIONS are invited for the appointment of CLERK OF WORKS. The duties will cover the reconstruction of the Walsall Works over a period of approximately 5 years.

Applicants should have a sound experience as Clerk of Works to building trades and civil engineering, having knowledge of piling, mass foundations, reinforced concrete, structural steel and brickwork, and be able to regulate progress on such work.

The salary will be within the range of Grade XI of the Salary Scales of the National Joint Council for Gas Staffs (£595-£720), and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, accompanied by names of two referees, are to be sent to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.

ASSISTANT TO DIVISIONAL ENGINEER.

APPLICATIONS are invited from suitably qualified persons for the above position.

Candidates must have had experience in the construction and maintenance of Gasworks Plant in general, and the preparation of major schemes in all their aspects for extensions to Works and Plant.

The salary will be £900 per annum.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Personnel and Establishment Officer, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote Ref. T.P.3, when replying to this advertisement.

F. H. CURETON,
Secretary.

DRAUGHTSMAN with sound knowledge of gasworks and allied chemical plant design required. Age 35 or upwards. Pension scheme. Permanent position to suitable applicant.

Fullest details of experience, age and salary, to R. & J. DEMPSTER, LTD., Gas Plant Works, Manchester 10.

DRAUGHTSMEN required for Chemical Works in North Lincolnshire, age 20-25, must have had good general training with some workshop experience and with technical qualifications up to H.N.C. The positions offered are permanent with good prospects. Write, stating age, experience, qualifications and salary required, to: No. 9946, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WALES GAS BOARD

CARDIFF UNDERTAKING.

APPLICATIONS are invited for the following appointments to the Cardiff Undertaking:—

WORKS CHEMIST. Applicants should have had experience in carrying out all the necessary routine tests required in modern gasworks practice, including analyses of coal, coke, by-products, etc.

TECHNICAL ASSISTANT (COAL TESTING). The appointment involves responsibility for the whole of the work carried out at the Coal Testing Laboratory at Grangetown Gasworks, Cardiff, including the control and operation of a $\frac{1}{1,000}$ ton Coal Test Plant.

The applicant should be qualified by training and experience to undertake this work, which will cover all classes of coal carbonised throughout the Undertakings of the Wales Gas Board.

The salary in each case will be in accordance with Grade VII of the Board's Scale of Salaries (£450 to £530 per annum).

The successful candidates will be required to pass a medical examination and will be subject to the provisions of any superannuation scheme which the Board may introduce.

Applications, stating age, training, qualifications and experience, accompanied by the names of two referees, should be made to the undersigned not later than February 5, 1951.

FRANK BOARDMAN,
Engineer and Manager.

Gas Offices,
Bute Terrace,
Cardiff.

SALES MANAGER / REPRESENTATIVE required by large manufacturers of Gas Meters, etc., in the North-West, with well-established connection in the North of England. Experience in the Gas Industry essential, and applicants are asked to give fullest particulars which will be treated in the strictest confidence. Remuneration commensurate with the importance of the position, and Pension and Life Assurance scheme in operation. Apply No. 9944, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

TECHNICAL SALES REPRESENTATIVE required with experience in Gasworks and By-Product Plant design, construction and operation. Suitable applicants should be between 30 and 45 years of age, preferably with higher grade certificate of the Institution of Gas Engineers or equivalent qualification. Membership of the Institution of Gas Engineers an advantage. The appointment is superannuable and includes the use of a company car and participation in an efficiency bonus scheme. Please write stating age, qualifications, experience and salary required to the Personnel Officer, Newton Chambers & Co., Ltd., Thorncliffe, Sheffield.

EASTERN GAS BOARD

IPSWICH DIVISION.

COLCHESTER UNDERTAKING.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at Colchester Gas Works.

Applicants should hold the Institution's Higher Grade Certificate in Gas Engineering (Manufacture) and have experience as well as the practical knowledge of general works operation, control of Continuous Vertical Retorts and drawing office and laboratory practice. Constructional experience will be an advantage.

The salary will be in accordance with Grade VI, £415 to £495 per annum.

Applications, stating training, experience, qualifications and age, should be addressed to the undersigned to be received within 14 days of the date of this advertisement. The application should give the names of two referees.

F. ALLEN,
Group Manager.

Eastern Gas Board,
Gas Works,
Colchester.

EASTERN GAS BOARD

SUDBURY DISTRICT.

DISTRICT SUPERINTENDENT.

APPLICATIONS are invited for the position of DISTRICT SUPERINTENDENT to the above District.

The Sale of gas in this district is approximately ninety-eight million cubic feet per annum.

Applicants should have received a sound practical training and should have experience in modern distribution methods. The duties of the successful candidate will include advising consumers and preparing estimates for the installation of all types of gas apparatus.

A five-room flat over the Board's showroom is available at a reasonable rent.

The salary will be in accordance with the A.P.T. Grade IV (Provincial B—£235-£405), the initial salary being determined by the qualifications and experience.

The successful candidate may be required to pass a medical examination and will be subjected to such Superannuation Regulations as the Board may, in due course, adopt.

Applications, stating age, and giving full particulars of education, training and experience, should be forwarded to the Group Manager, Bury St. Edmunds Group, Gasworks, Bury St. Edmunds, to reach him not later than fourteen days after the appearance of this advertisement.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (ctd.)

EASTERN GAS BOARD

CAMBRIDGE DIVISION.
BEDFORD DISTRICT.

APPLICATIONS are invited from suitably qualified persons for the position of JUNIOR DRAUGHTSMAN at the above Undertaking.

Applicants should have had experience of Gasworks Plant and equipment and general drawing office routine. The salary will be within the range of A.P.T. Grade XI Provincial "A" and the commencing salary will be in accordance with the experience of the person appointed. The successful applicant will be required to pass a medical examination and will be subject to such superannuation regulations as may in due course be adopted.

Applications, stating age and giving full particulars of qualifications and experience, together with the names of two referees should be sent to the Group Manager, Eastern Gas Board, Cambridge Division, Bedford District, Ford End Road, Bedford, within fourteen days of the publication of this advertisement.

EASTERN GAS BOARD

CAMBRIDGE DIVISION.
CAMBRIDGE DISTRICT.
TECHNICAL ASSISTANT.

A VACANCY exists for a TECHNICAL ASSIST-ANT for a Works producing 1,500 million cu. ft. of gas per annum by means of horizontal and vertical retorts and Carburetted Water Gas.

The person appointed will be required to assist in the technical control of gas production and purification, the operation of by-products, steam raising and water softening plant.

Candidates should be between 25 and 30 years of age and should hold the Higher Certificate of the Institution of Gas Engineers in Gas Manufacture or equivalent qualification.

Salary will be within the range of Grade VII of the Salary Scales of the National Council for Gas Staffs and will depend upon qualifications and experience.

Applications, stating age, training, qualifications and experience and giving the names of not more than three referees, should reach the undersigned by Saturday, February 3, 1951.

E. H. WINCH,
Engineer and Manager.

Eastern Gas Board (Cambridge Division),
Cambridge District,
Gas Works,
Newmarket Road.
Cambridge.

EASTERN GAS BOARD

CAMBRIDGE DIVISION.
No. 1 (CAMBRIDGE) GROUP.
DRAUGHTSMAN.

A VACANCY exists for a DRAUGHTSMAN in the Cambridge Drawing Office of the No. 1 (Cambridge) Group, Eastern Gas Board.

The duties will include the preparation of designs and estimates for the installation of gas works plant and Services of all kinds and for the construction of simple industrial buildings for the Undertakings within the Cambridge Group. Previous gas works experience will be an advantage.

The candidate should preferably possess a recognised engineering qualification or have equivalent experience and should be between 23 and 30 years of age, free of National Service commitments. Commencing salary will be according to qualifications and experience.

Applications, stating age, particulars of qualifications, experience and other relevant details, together with the names of two referees should reach the undersigned not later than 14 days from date of publication of this notice.

E. H. WINCH,
Engineer and Manager.

Eastern Gas Board (Cambridge Division),
Cambridge District,
Gas Works,
Newmarket Road, Cambridge.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.
SENIOR DISTRICT DISTRIBUTING ENGINEER —BLACKBURN DISTRICT.

APPLICATIONS are invited for the post of SENIOR DISTRICT DISTRIBUTING ENGINEER in the Blackburn Group.

The successful applicant will be responsible for the distribution of gas in a part of the Blackburn District's area and will also be required to assist the Group Distributing Engineer in his Group Control.

Applicants should hold the Higher Grade Certificate of the Institution of Gas Engineers and have experience in the design and installation of high pressure gas supply.

The salary will be within the range of £520-£620 per annum, i.e., Grade IX of the National Salary Scales.

The successful applicant may be required to undergo a medical examination and to subscribe to such scheme of Superannuation as the Board may adopt.

Applications, stating age, qualifications and details of training and experience, together with the names of two referees, should be addressed to the undersigned to be received not later than 12 days following the date of the publication of this advertisement.

A. H. NICHOLSON,
General Manager.

Cardwell Place,
Blackburn.
January 11, 1951.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.
DISTRICT SERVICE MANAGER.
DARWEN DISTRICT.

APPLICATIONS are invited from suitably qualified and experienced persons for the above position.

The successful applicant will be responsible for all branches of consumer service, including the control of the gas fitting and maintenance staff and the supervision of showrooms.

The salary will be within the range of Grade IX of the National Salary Scales (£520-£620 per annum), according to experience and qualifications.

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, appropriately endorsed and giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees, should reach the undersigned not later than 12 days after the publication of this advertisement.

A. H. NICHOLSON,
General Manager.

Cardwell Place,
Blackburn.
January 12, 1951.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.
DISTRICT SERVICE OFFICER.
CLITHEROE DISTRICT.

APPLICATIONS are invited from suitably qualified and experienced persons for the above position.

The successful applicant will be responsible for all branches of consumer service, including the control of the gas fitting and maintenance staff and the supervision of showrooms.

The salary will be within the range of Grade VII of the National Salary Scales (£450-£530 per annum), according to experience and qualifications.

The successful applicant may be required to pass a medical examination, and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, appropriately endorsed and giving personal details, particulars of training, qualifications and experience, together with the names and addresses of two referees should reach the undersigned not later than 12 days after the publication of this advertisement.

A. H. NICHOLSON,
General Manager.

Cardwell Place,
Blackburn.
January 11, 1951.

NORTH WESTERN GAS BOARD

BLACKBURN GROUP.
INDUSTRIAL SALES ENGINEERS.

APPLICATIONS are invited for the above appointments within the salary range of Grade A.P.T. VII of the National Salary Scales (£450-£530 per annum).

Applicants should have had considerable experience in the installation and operation of Industrial Gas Appliances and should possess the Higher Grade Certificate of the Institution of Gas Engineers (Supply) or equivalent qualification.

The successful applicants may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, giving details of experience and stating age and qualifications, together with the names of two referees, should be addressed to the undersigned in envelopes endorsed "Industrial Sales Engineer," to be received not later than 12 days following the date of publication of this advertisement.

A. H. NICHOLSON,
General Manager.

Cardwell Place,
Blackburn.
January 11, 1951.

NORTH WESTERN GAS BOARD

SOUTH LANCASHIRE GROUP.
WARRINGTON WORKS.
CHIEF DRAUGHTSMAN.

APPLICATIONS are invited for the above position.

Applicants should preferably have had experience in a Gas Undertaking or with a Gas Plant Contractor and be capable of preparing scheme drawings and detailed drawings in connection with the development of gas works and the maintenance of gas production and ancillary plant.

The salary will be within the range of Grade A.P.T. IX of the National Salary Scales (£520-£620 per annum) according to qualifications and experience.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of Superannuation as the Board may adopt.

Applications, appropriately endorsed, giving personal details, particulars of training, qualifications and experience, together with the names of two referees, should reach the undersigned not later than 14 days from the publication of this advertisement.

R. L. GREAVES,
General Manager.

Radiant House,
St. Helens, Lancs.
January 12, 1951.

DRAUGHTSMEN
GAS PLANT.

IMPORTANT Midland Company require a number of first class DESIGN and/or DETAILING DRAUGHTSMEN for all classes of Gas Holders and Gas Plant, etc., positions offer exceptional experience.

Canteen and excellent working conditions available.

Particulars and salary required to Personnel Manager, Horseley Bridge and Thomas Piggott, Ltd., Tipton, Staffs.

SENIOR DRAUGHTSMAN required as Section Leader. Must have extensive experience of design of large and medium sized Spiral Guided Gasholders. Pension scheme in operation. Apply: Henry Balfour & Co., Ltd., Durie Foundry, Leven, Fifeshire.

GASHOLDER LEADING ERECTOR required, experienced in the erection of large Spiral Gasholders and willing to go overseas from time to time. Bonus scheme in operation and special rates of pay when abroad. Apply to: Henry Balfour & Co., Ltd., Durie Foundry, Leven, Fife.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.
DRAUGHTSMEN.

VACANCIES exist for DRAUGHTSMEN in the Manufacture and also the Industrial Sales Department of the Group.

Applications are invited from suitably qualified persons for the above positions.

The salary will be within the range of £450-£530 per annum and will be governed by the conditions of service agreement of the National Joint Council for Gas Staffs; the commencing step on this scale to be commensurate with experience and qualifications.

The following experience will be an advantage:—

DRAUGHTSMEN (MANUFACTURE).
A thorough knowledge of Gas Works Plant, building and foundation work, with capacity to supervise the construction of such work on site if necessary.

DRAUGHTSMEN (INDUSTRIAL GAS SALES).
Design of Industrial Gas Appliances and layout of installation work.
Furnace Construction.
Heating and ventilating engineering experience.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Letters of application, giving details of experience and stating age and qualifications, should be addressed to the undersigned in envelopes endorsed "Draughtsmen," to be received not later than 14 days after the publication of this advertisement.

JOHN WILSON,
General Manager.

Town Hall,
Manchester, 2.

PLANT FOR SALE

CONNELL OF COATBRIDGE

OFFER THE FOLLOWING FOR IMMEDIATE DISPOSAL.

0-6-2 Standard Gauge, side tank STEAM LOCO-MOTIVE by The North Stafford Railway Co., Ltd., Crewe. Cylinders 18½ in. dia. × 26 in. stroke. Boiler pressure 175 lb., Tractive effort 22,060 lb.

0-4-0 Standard Gauge, saddle tank STEAM LOCOMOTIVE by Andrew Barclay Sons & Co., Ltd., Kilmarnock. Cylinders, 12 in. bore × 22 in. stroke. Boiler pressure 125 lb., Copper firebox. Brass Tubes. Ready for immediate service.

0-6-0 Standard gauge side tank STEAM LOCOMOTIVE by Kerr Stuart & Co. Cylinders, 12 in. dia. × 20 in. stroke. Boiler pressure 160 lb.

0-4-0 Standard gauge, side tank STEAM LOCOMOTIVE by Andrew Barclay Sons & Co., Ltd., Kilmarnock. Cylinders, 10 in. dia. × 18 in. stroke. Boiler pressure 160 lb. Tractive effort 6,750 lb.

0-4-0 Standard gauge, saddle tank STEAM LOCOMOTIVE by The N.B. Loco Co., Glasgow. Cylinders, 12 in. dia. × 20 in. stroke. Boiler pressure 140 lb.

2 ft. gauge DIESEL LOCOMOTIVE by Ruston & Hornsby, Ltd., 16-20 H.P.; fitted with two cylinder Lister Diesel Engine.

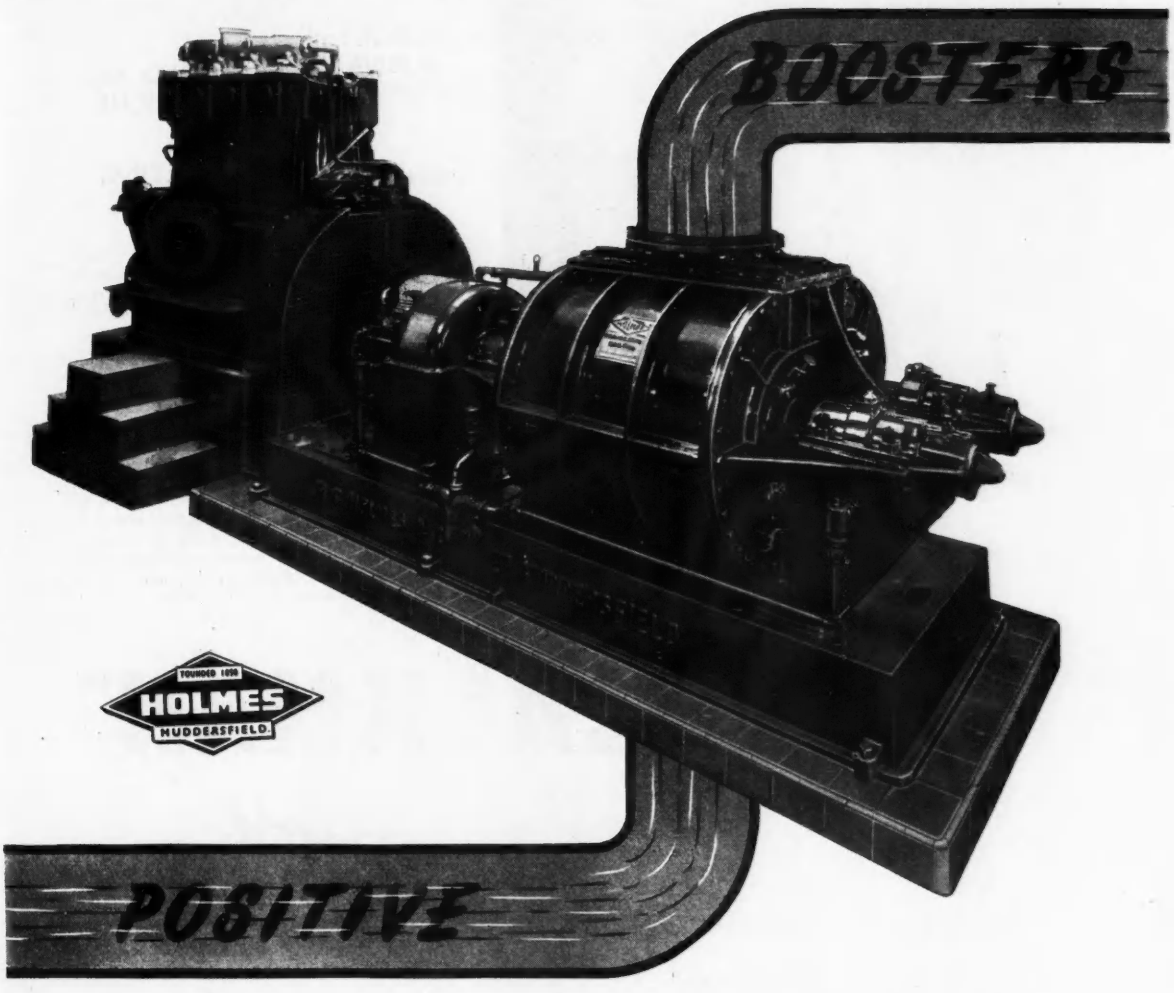
2 ft. gauge DIESEL LOCOMOTIVE by Simplex; 28 H.P.; fitted with two cylinder Dorman Riccardo Diesel Engine. Seven available.

For full particulars apply to:

JAMES N. CONNELL LIMITED
PHOENIX & CLIFTON WORKS,
COATBRIDGE, SCOTLAND.

Telephone: Coatbridge 1121 (5 lines).

Holmes — Connersville



Reliable plant means confidence and peace of mind to the engineer.

Efficient operation and years of trouble-free service result from a wise choice of boosting equipment.

Such features are an inherent characteristic of the Holmes-Connersville Booster.

W. C. HOLMES & CO. LTD. · HUDDERSFIELD · LONDON · BIRMINGHAM

Telephones Huddersfield 5280 London, Victoria 9971 Birmingham, Midland 6830

© 313

A Keith Blackman Induced Draught Fan in Operation.

VENTILATION — HEATING

GAS BOOSTING and EXHAUSTING — MECHANICAL DRAUGHT

FURNACE RE-CIRCULATING

FORGE and FURNACE BLAST — COLD AIR DOUCHE

MAN-COOLING — DRYING

WE make all types of Fans—"High Efficiency" for boosting or exhausting gas up to 3 lbs. p.s.i. and for volumes from 5,000 to 1,500,000 cfph; Cast Iron and Steel-plate "Pressure" fans for up to 2 lbs. p.s.i. air blast to furnaces, forges, water gas plants, burner equipment, etc; "Turbo" fans for applications requiring up to 6 lbs. p.s.i.; "Centrifugal" fans for draught on boiler fires to ensure economical steam production, or for cold air douche to workers in retort houses, etc.; "Centrifugal" or "Axial" fans for supplying ventilating air through ductwork; "Propeller" fans for moving air in volume for ventilating; "Propeller" fans on portable structures for cooling workers at furnace fronts; and "Tenaxe" fans for re-circulating high temperature gases and air in various types of heat treatment furnaces.

"KEITH-BLACKMAN"

FANS *for every purpose*

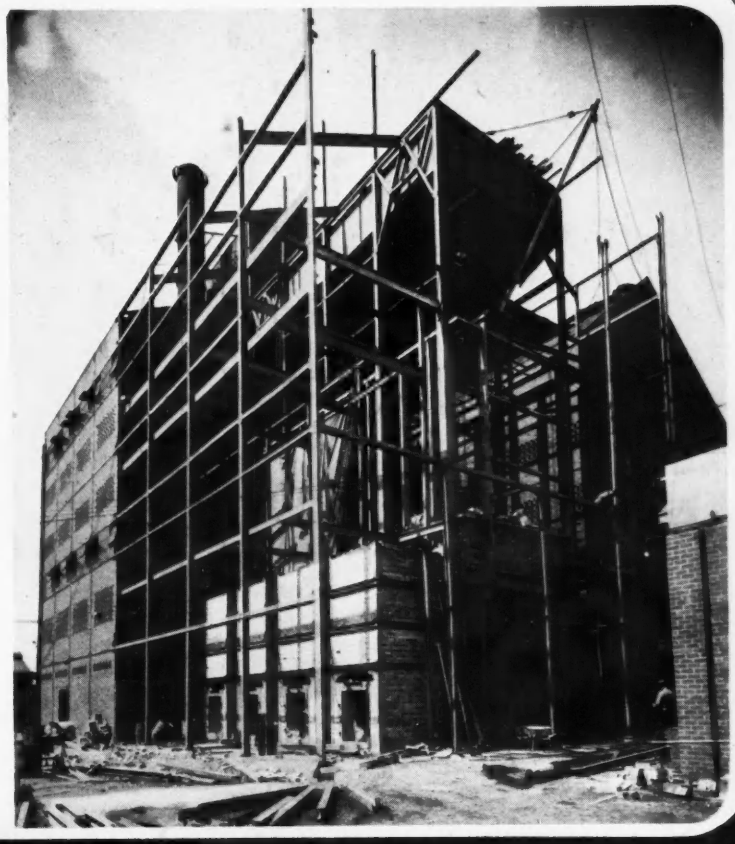
for which fans are essential.

When you need Fans for an opportunity of making moving air or gas give us practical suggestions.

KEITH BLACKMAN LTD
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17.
TN: TOTtenham 4522. TA: "Keithblac Norphone London."
MANCHESTER, 4: 26 Corporation Street. Tel. No.: Blackfriars 4228. BIRMINGHAM, 2: 75 New Street. Tel. No.: Midland 0317-8.
LEEDS, 1: 40/41 Royal Exchange Chambers. TN: Leeds 27286. NEWCASTLE-ON-TYNE 1: 21 Mosley St. TN: Newcastle 22284.
SCOTLAND: 90 Mitchell Street, Glasgow, C1. TN: Central 7973. IRELAND: 7 Brunswick St. Belfast. TN: Belfast 21114.
SOUTH WALES: 127 Stanwell Road, Penarth, nr. Cardiff. TN: Penarth 249.

Printed by STRAKER BROTHERS LTD., E.C.2, for WALTER KING, LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4. Wednesday, January 17, 1951.

Work in progress



FOOTSCRAY, AUSTRALIA

Since the original carbonizing plant at Footscray consisting of 24 retorts was installed in 1926, several additions have been made. The latest extension, shown here, comprises 56 retorts, bringing the total number of retorts to 80.

West's Gas
IMPROVEMENT CO., LTD.
MILES PLATTING, MANCHESTER, 10
Telephone: COLlyhurst 2961–5. Telegrams: Stoker, Manchester.
London Offices: CROMWELL HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108–9. Telegrams: Wesgasco, Estrand.

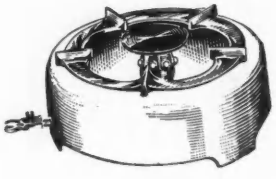
NEAT

Points that tell..

..at the Point of Sale

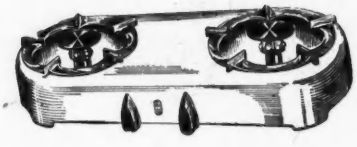
FA-NEAT GAS COOKING RINGS

The two distinct types of FA NEAT gas cooking rings both employ the same kind of burner. This consists of a central member fitted with eight Neat jets. These burn gas and air at the point of combustion and provide control from boiling to simmering without lighting back. They are silent, and have single point adjustment.

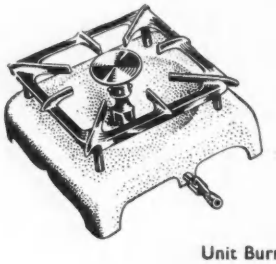


Hotplate FA/1

These handsomely styled appliances incorporate one or two rings respectively. The main structure is pressed steel, vitreous enamelled in grey or cream, with a light alloy pan support ring which is removable to facilitate cleaning.
These models are specially designed for domestic use, and are particularly suitable for dwellers in flats and bed-sitting rooms.



Hotplate FA/2



Unit Burner FA/4

This square type has the advantage that units can be added to make up two, three, four or more burner cookers by using a simple coupling with independent tap controls. It is sturdily constructed and will stand up to hard and continuous use. Quickly dismantled and easily cleaned, this unit burner is invaluable in the house and in canteens, hotels, restaurants, clubs or any place where hot foods and drinks are required quickly and in quantity. The standard finish is grey mottled vitreous enamel.

Unit Burners FA/4/4

ASCOT

Manufacturers and Sole Distributors:

ASCOT GAS WATER HEATERS LIMITED

43 PARK STREET · LONDON · W1